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Steel Lumber Developed for Buildings*

New Light Sections Ideal
for Dwellings and All
Other Easy Loads

AS a producer of basic raw materials, the iron and steel industry must have a keen interest in the expansion of the building industry now taking place throughout the country. The outlet which the building industry has been for many years, for a fairly sizable tonnage of such items as sheets, shapes and bars, henceforth must widen and grow in importance. The reasons for this advance of steel in construction are fundamental. It is the old story of the abundance and superior quality of steel against a growing shortage and inferior quality of wood.

Statistics on timber land, usually given in terms of millions of acres, and sawed lumber, given in terms of billions of board feet, afford the casual person little hint of this shortage, but the persistently increasing prices of marketable wood should be notice to everyone that the supply is gradually falling below demand. In an exhaustive treatise on timber depletion, *Lumber prices, etc.*, published by the Forestry Bureau of

the Department of Agriculture in June, 1920, the clear cut statement is made that 4419 saw mills, representing 82 per cent of all the saw mills operating on virgin Southern pine, will have "cut out" in five years. The further unqualified statement is made that by 1930 the South will produce less pine than the Southern or home market will demand. Long leaf and short leaf yellow

*By Gilbert Canterbury, 619 Twelfth Street, N.W., Canton, Ohio.

Future Assured by Its
Own Qualities and a
Dearth of Timber

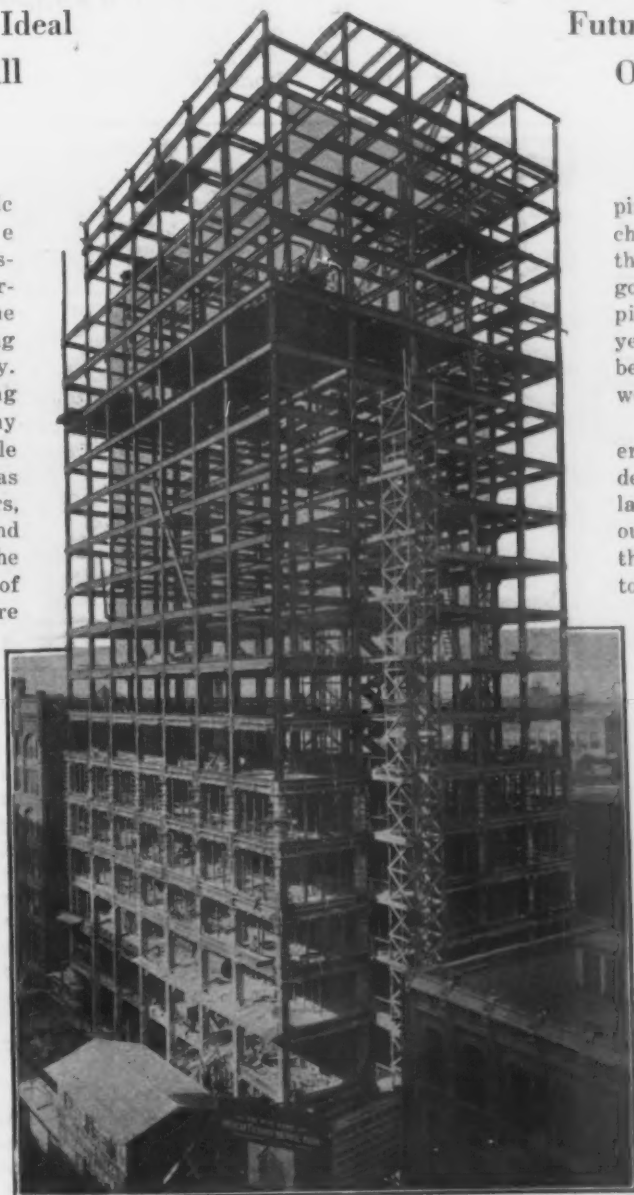
pine of the South, now the chief structural lumber of the East and Middle West, is going the way of the white pine of the North. In a few years only enough of it will be left for use as a specialty wood.

As the depletion of Southern pine increases, greater demand will be made on the last great timber stand of our country, the fir trees of the Pacific Slope. Even there, to quote the Department of Agriculture, "are already local evidences of depletion, warnings that the conclusion of our store of soft woods will be the same as that of other regions and in far less time than has generally been estimated."

Steel must take the place of wood for all structural purposes in building construction, for the simple reason that no other material suitable for the same purpose will be available. Specifically, this means that steel joists and steel studs, steel columns and steel beams must provide the frames or skeletons of buildings.

In considering this new outlet for steel ton-

nage, some new steel materials are coming into prominence. Chief of these are the light-weight structural sections known as steel lumber and expanded steel lath. Both of these products have made tremendous strides in the last few years. Steel lumber has developed to a mill production basis, with distribution through structural steel fabricators, in precisely the way heavy rolled structural shapes were developed. Steel lath has likewise secured public recognition and its use has devel-



American Exchange National Bank, Dallas, Texas, 21 Stories High, in Which the Floor and Other Loads Between Main Structural Girders Are Carried by Light Steel Lumber Joists

oped to a point where a goodly tonnage of sheets is now consumed annually in the making of this product. Materials are now available to make two tons of steel grow in the building industry where one grew before.

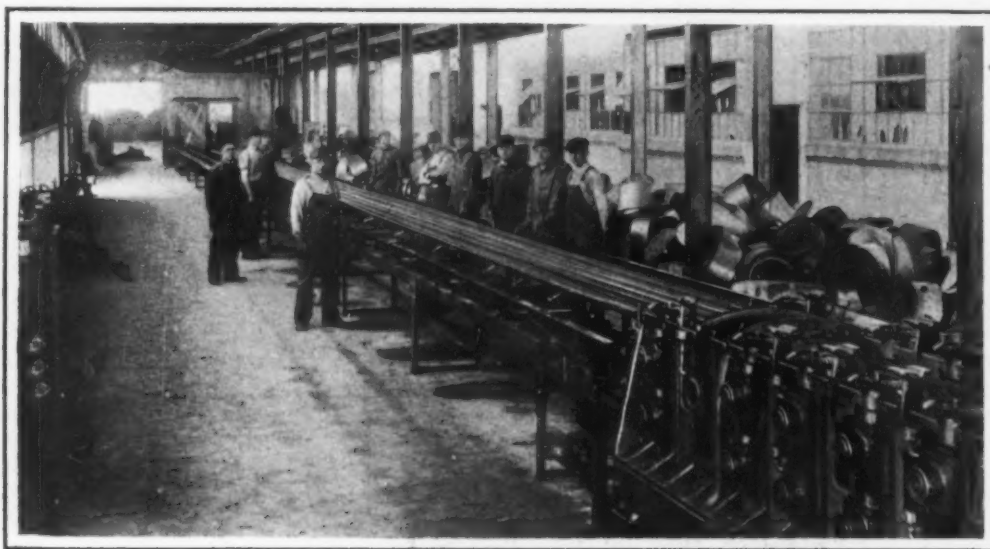
Another factor helping to bring about a general change to steel in the building industry is the increasing public consciousness of the importance of more fire-safe construction of buildings. As wood lumber has grown more scarce and more expensive, builders have harkened more and more to the teachings against combustible construction that have been flooding the country in gradually increasing volume during the last twenty years. Ever-mounting fire losses, now flourishing at the rate of \$365,000,000 annually, are becoming recognized as a great economic waste, and the fact that an average of 15,000 human lives are also lost in fires annually has helped to establish that public recognition.

Still another factor in the progress of construction, appealing to the steel industry, is the unquestioned need for greater permanency in buildings, aside from the hazards of fire. Wood is a porous, moisture-absorbing material which, generally speaking, has but a short life of usefulness under normal conditions. It rots and

Building, in New York, was the first outstanding achievement with this steel material. Since then, with it has been developed America's chief contribution to the world's architecture, the American skyscraper.

Fifteen years ago an entirely new structural steel section was perfected and placed at the disposal of the building industry. This new product, furnished in I-sections and channels, weighed only one-third as much as standard rolled structural steel I-beams and channels. These new sections were made from sheet steel originally. The channels were made by slitting and forming the sheets and the I-sections were made by placing two channels back to back and riveting them. This section formed the nucleus of what is now popularly known as the steel lumber industry.

Steel lumber, as its popular name applies, was originally designed to take the place of wood joists and studs in building construction. Through the associate use of expanded metal lath, which serves as a base for concrete or plaster, steel lumber has developed into structural material for thoroughly fireproof floor and wall construction. In the mill production of this product, slabs 6 to 8 in. wide, $3\frac{1}{2}$ in. thick and weighing from 300 to 750 lb., constitute the raw material. Spe-



Forming Light Steel Structural Sections from Hot Rolled Strip Steel Coils. The forming is done cold on the machine shown in right foreground, by means of the rolls, governed by the screws at the top

warps and shrinks and the yearly depreciation and annual bill for necessary repairs on a wooden building are notoriously large. The difficulty of maintaining our modern ideas of sanitation in wooden buildings produces another tendency toward the general adoption of some other building material.

Slow Development

Though some few elements of the steel industry have been aware of these changing conditions for a long time, steel makers as a whole have not given the attention to the building question that such a potentially large outlet for tonnage deserves. Fifty years ago, cast iron and wrought iron constituted the industry's sole contribution to the business of construction.

Not so many years ago engineers were still experimenting with vastly different materials, in vain efforts to expand the usefulness of those materials beyond their physical limitations. Buildings with solid brick bearing walls were attempted to heights beyond the crushing point of bricks. The Monadnock Building, in Chicago, was achieved in one of these experiments by methods which to-day would be utterly prohibitive in cost. The building still stands as an engineering marvel. The Pulitzer or World Building, in New York, has foundation walls 13 ft. thick.

Hot rolled structural steel sections were at length developed. With these, steel frames or skeletons of buildings were erected so that masonry walls were supported by the steel, and each story was a separate unit so far as the masonry was concerned. The 10-story Tower Building, in lower Broadway, recently razed to make way for a larger structure, was the first steel frame building of modern type, but the famous Flatiron

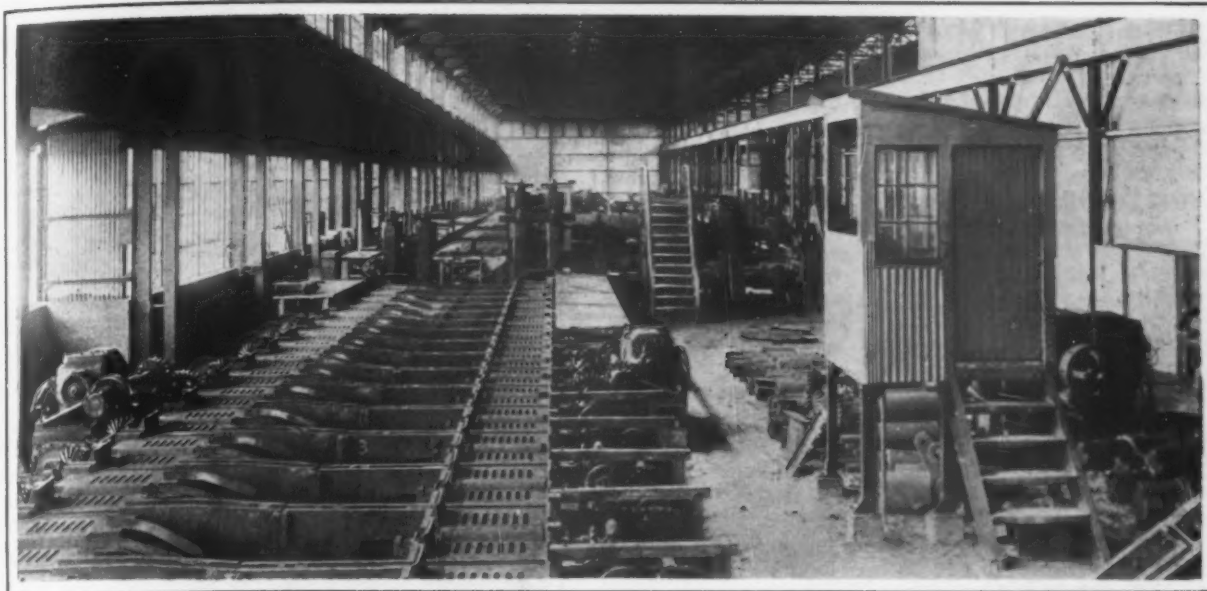
Building, in New York, was the first outstanding achievement with this steel material. Since then, with it has been developed America's chief contribution to the world's architecture, the American skyscraper.

These strips are finished hot and coiled. The coils, when cold, are fed into cold-forming mills which produce the steel lumber channel sections. The steel lumber I-sections are produced by placing two channels back to back and feeding through automatic electric spot welders. Ends are trimmed with high speed friction saws and the shop coat of paint is applied immediately after forming by dipping the sections into paint vats. The steel for these operations, up to the point of painting, is handled on a series of roll-tables and a remarkably efficient practice on heavy tonnage has been established.

Distribution of the mill-produced steel lumber is through the same companies which fabricate and erect heavy rolled structural steel shapes. The steel lumber sections, shipped from the mill in lengths limited only by transportation facilities, are cut to exact length for use by the distributor-fabricator. In large buildings steel lumber sections pick up the light loads of floors and partitions and accumulate them to a point where they can be more economically carried by heavy steel sections. In small structures, like dwellings, they take the place of wood joists and studs.

What Steel Offers

The steel industry now provides, for building construction, (a) heavy rolled structural shapes capable of carrying all heavy loads and stresses in a building. (b) light, pressed steel sections capable of carrying the lighter loads and (c) expanded steel lath as a base for plaster or cement stucco. With these products, practi-



Finishing Train and Run-out Rollers, in the Plant of the Central Steel Co., Massillon, Ohio, Used in the Manufacture of Metal Lumber from Hot Rolled Strip Steel

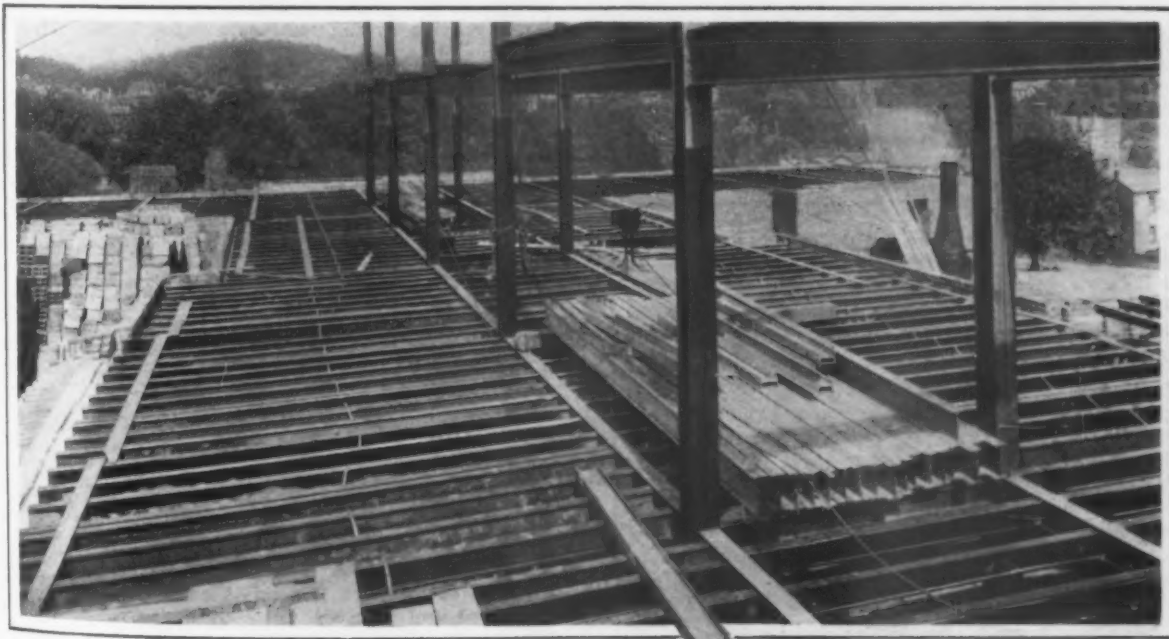
ally every kind of building can be erected for which there is present-day use.

In addition, the industry provides now, as it has in the past, cast iron columns and other building products, wrought iron for fire escapes, grills, pipe, nails, concrete reinforcing rods and a host of sheet steel products such as corrugated sheets, ventilators, door and window frames, base board, stamped roofing, stamped ceiling, etc. At the dawn of the era of building with steel, the steel industry finds itself well equipped to discharge its responsibilities in the direction of building construction with the same efficiency with which it took over the construction of ships, railroad cars, wagons and automobiles and the thousand and one other industries in which the use of wood has become obsolete.

The light structural steel or steel lumber sections and metal lath are leading the van of this fine array of steel materials in the advancement of sales methods. And much of this work is necessary, if our steel material manufacturing facilities are to be built up sufficiently to take care of the inevitable demand. Sales effort must carry the industry over the period of tran-

sition from wood to steel. As an industry, steel has not been a good salesman; and nowhere has poor salesmanship been so apparent as in the handling of steel for the building industry.

Many fallacies exist in regard to such points as the resistance of steel to fire, to corrosion and other destructive agencies. It was upon this foundation of a general misunderstanding of steel that concrete stepped into a prominent position in the building industry. Used first in sidewalks, foundations and similar work, concrete came finally to function as structural building material, displacing steel sections designed specifically for that purpose. This practice afforded outlet to the steel industry only for reinforcing bars, and greatly reduced total steel tonnage. Concrete columns and beams came into use and through the adroit use of a little steel in the way of bars, and the height of concrete structures was run up over 200 ft. The early incomplete line of steel building materials, and the consequent dependence of the industry upon foreign accessory materials, aided this advance of concrete. For instance, a structural steel frame of a large building used masonry



Light Steel Lumber Floor Joists Used in Conjunction with Rolled I-Beam Girders and Built-up Columns. The joists distribute the local loads to the girders and thence to the supporting columns

walls and depended upon concrete, hollow tile or some similar material to carry the lighter loads of floors and roof.

Light steel lumber sections now remedy this condition. Buildings are being erected with heavy rolled steel frames and floors and roof supported on steel lumber I-sections. Expanded steel lath spreads across these steel floor joists and acts as centering and reinforcement for a thin slab of concrete. Thus steel has come back to its original function of serving as structural material, and concrete is used only in sufficient quantities to provide additional fire resistance. Remarkable economies are being achieved in this practice. Besides enormously decreasing the dead weight of buildings, great savings are made in labor. No dead work applies to steel construction, while in concrete construction falsework must be built up to form and support the concrete until it hardens.

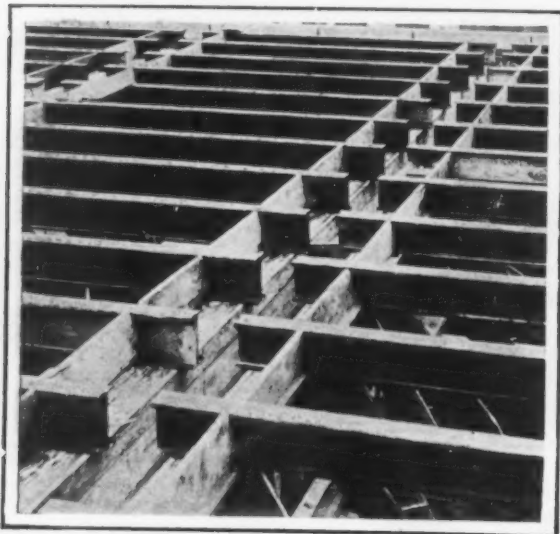
But the larger sized fireproof buildings represent only a portion of the outlet for steel to the building industry since the advent of light steel lumber sections and expanded steel lath. Steel joists and steel lath now find a market in small commercial buildings, where the heavy rolled structural steel a few years ago had no market whatsoever. Steel joists and steel lath are used in floor and roof construction in strictly masonry bearing wall buildings of two and three stories in height. In buildings of this character the steel joist tonnage alone averages approximately 200 tons per 100,000 sq. ft. of floor surface. In the larger buildings, where floor joist spans are usually greater, the steel joist tonnage will run from 275 to 300 tons per 100,000 sq. ft. of floor surface.

The steel lath required for such construction is double the amount of floor surface to be built, since the lath is used as centering and reinforcement for the concrete slab on top of the joists and is also attached to the bottom flanges of the joists as a base for ceiling plaster. A certain amount of heavy rolled steel shapes are required even for these small commercial buildings as lintels, and as supporting beams to break joist spans, and some cast iron posts are likewise frequently used.

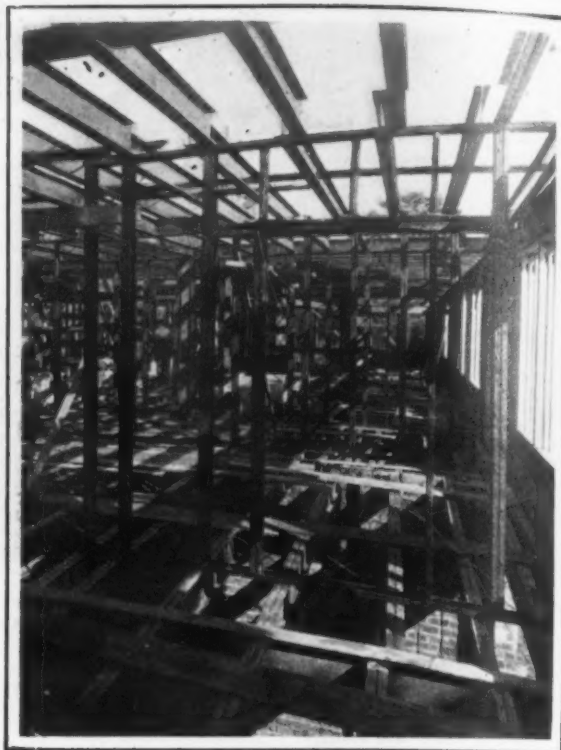
The general utility of the steel lumber floor joists and steel lath are causing them to find market, also, in construction of public schools, hotels, theaters, apartments, garages and practically every type of occupancy where the live floor loads are not excessive and where, a few years ago, steel found no appreciable outlet.

In cities, all buildings of these types in certain zones are required to be constructed fire-safe and some buildings, like schools, theaters, etc., are often required by State laws to be built fire-safe, regardless of location. Thus the use of combustible or wood materials gradually falls off through enforcement of safety measures, leaving reinforced concrete as the only competitor of steel in strictly structural materials.

Steel joists and expanded sheet steel lath are open-



Steel Lumber Joists Set into Forms, with the Ends to Be Embedded in Reinforced Concrete T-Beams, in the Y. M. C. A. Building at Hagerstown, Md.



Light Steel Joists and Light Pressed Steel Sections for Bearing Partitions, with Rolled Structural Steel Main Framing

ing a market, also, among the builders of dwellings, even to the inclusion of the small, single-family bungalow. This field represents the absolute base of the building construction industry. It has well been said that no producer of building materials has really invaded the building industry until he has provided something for use in dwellings. Normally, dwelling construction outstrips all other types of buildings and represents about 30 per cent of the entire activity of the building industry. During the first eight months of 1922 the Dodge reports show that 37½ per cent of all awards has been for residential property. The bare statement, made so many times during the last year, of a United States shortage of 1,500,000 homes, gives sound reason for the conjecture that residence construction will continue for many years to consume a large portion of the materials going into the building industry.

It is the function of steel to reduce and eventually eliminate the hazard of fire in dwellings and its medium for this purpose is the light structural section of steel joists and steel studs. The preliminary effort of steel in this direction should be in furthering the practice of building fire-safe first floors. The logic for this practice is found in the fact that the major fire hazards of the home are located in the basement. A large majority of dwelling fires originate either in the basement or in the first floor. Here are located such well known fire hazards as furnaces, hot-water heaters, horizontal heating pipes, coal, ash bins and frequently open-flame laundry stoves, gas jets, etc., as well as cooking and other stoves, open grates, etc.

A high measure of fire protection may be secured if a steel joist fire-safe first floor is spread across the foundation walls. In this construction metal lath may be attached to the underside of the steel joists and plastered, after which the regular double wood floor surface can be laid on the tops of the joists. Nails can be driven right into the webs of the joists. Another practice is to leave the joists exposed or open in the basement and to lay metal lath on the top sides of the joists, and cover with a 2-in. concrete slab, embedding wood screeds to which the wood floor surface may be nailed. The cost of this steel joist first floor construction closely parallels the cost of combustible and dangerous wood joist floor construction.

The first principle of fire-safe and more permanent construction is the elimination of combustible and rap-

idly deteriorating materials. It follows, then, that added advantages are secured through the use of steel joist second floors and roofs, steel stud partitions and steel framed or solid masonry walls. The first installation of steel lumber joists and studs was a duplex dwelling, built fifteen years ago at Tuxedo Park, N. Y., and originally designed for wood lumber structural members. H. M. Naugle, who had conceived the idea of the light steel structural sections, re-designed the building, replacing every stick of wood shown on the plans with the steel lumber sections.

This 16-room building was erected by the Taft-Howell Co., Cornwall-on-the-Hudson. About 18 tons of steel lumber were used. The building was started in May and finished in October. The cost at that time was \$5,700. Some miscalculations were made by the contractors in their estimate of this very first steel frame dwelling ever erected, but the same contractors agreed to duplicate the house at that time for \$6,300. As early as 1912 the United States Government, recognizing the economy and advantages of steel lumber construction, purchased 44 carloads of steel lumber and shipped it to Honolulu, where it was used in the erection of 33 16-room and eleven 14-room structures at the army barracks there. In these buildings the steel lumber took the place of all structural wood material.

The general size of the great building industry to which these various steel products appeal has never been accurately estimated. No systematic record is kept of total building construction in cities, and no record at all is kept of total building work on the farms. The "Statistical Abstract of United States" gives data on building permits

issued in 69 cities, with an aggregate population of 26,000,000, for the year 1920; the number of permits is set forth as 249,368 and the total valuation \$1,115,151,000. The Dodge reports show building contracts awarded in 1919 to a valuation of \$2,077,000,000, in 1920 to a valuation of \$1,996,894,000, in 1921 to a value of \$2,356,000,000 and in eight months of 1922 to \$2,362,872,000. These reports cover only 27 States and only towns of over 3000 population in those States. It appears safe to estimate that our annual building construction amounts to something well over two billions of dollars annually. In King's "Wealth and Income of the People of the United States," the total income of the people of the country is set at 18 billions of dollars in 1900 and 31½ billions of dollars in 1910. Estimates for 1920 have run as high as 55 billions of dollars.

But the question of the relative importance of the building industry in the general commercial activity of the nation is of slight importance. Certainly it is vast and assuredly it now presents for the steel industry, with its fine line of steel materials, an enormous outlet for tonnage.

So far the record of steel in building construction is practically flawless. It is popularly known to possess an enviable line of virtues, the chief of which lies in the fact that steel is a definitely known and uniform quantity. There is little or no guess work about building with steel. Factors of safety in all the steel products are large and definite. The performance, particularly, of the heavy rolled shapes and the steel lumber sections has set the building industry's standard for long life, economy and general reliability.

Casting Aluminum Bronze for French Coinage*

The French Government has decided to replace the paper money notes at present in circulation with small, golden-like coins of aluminum bronze.

In 1909 the French Ministry of France set up a Commission to propose a likely metal to replace the old coins then in existence. This commission asked an engineer who specialized in the question of alloys, P. H. Gaston Durville, to prepare bronzes of aluminum which should approach as near as possible to the metal of Sainte-Claire Deville, who experimented half a century ago, calling it French metal.

M. Durville is now preparing homogeneous ingots possessing a greenish-gold color, which can be polished as well as the hardest steels. One of the chief difficulties to be faced was the inclusion of slags, air bubbles and other oxidized bodies when pouring the ingots. To overcome this, M. Durville invented and patented, in 1913, the apparatus illustrated. It is composed of an ingot mold and a pocket or ladle rigidly connected with each other by a communicating canal. These three elements are kept in a straight line, once they

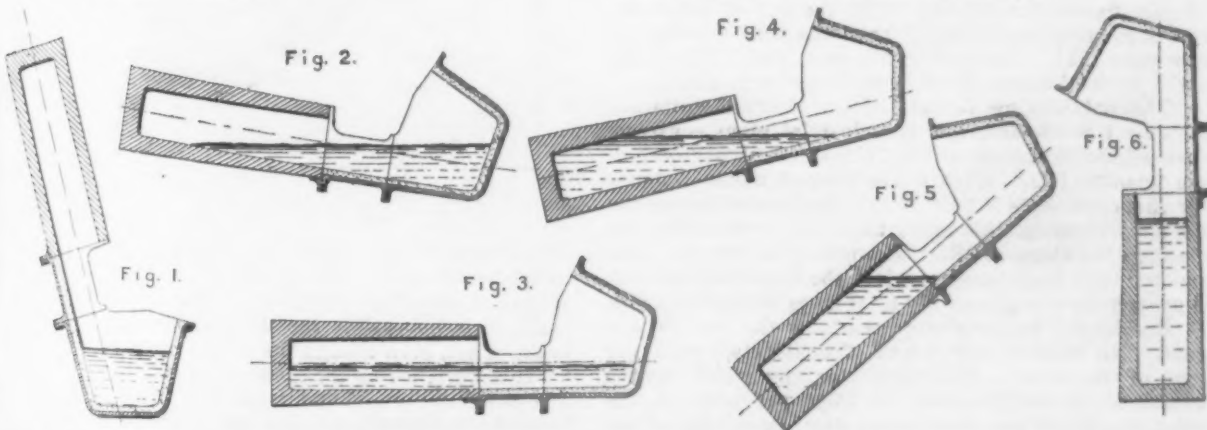
are brought together. The ladle and the canal are lined with a refractory material.

At the factory at Mouy-Bury, where the Alloy and Forgeable Bronze Company employs the Durville method, the alloy is melted in a crucible, its free surface oxidizes and becomes covered with a film of alumina, which protects the parts of the bath below it from further oxidation. Once the alloy is melted, the pouring must be effected without the slightest agitation.

From the crucible the alloy is poured into the ladle, which is then rapidly attached to the ingot mold. The whole apparatus is then tilted, as shown successively in Figs. 1 to 6, and the molten mass flows gently from the ladle into the four compartments into which the ingot mold is divided. As will be seen, the surface of the liquid bronze is kept horizontal throughout the operation. The alloy occupies successive positions without the least jerk, until it arrives in the ingot mold, where it solidifies. Its passage from one to the other is accomplished gently and evenly, in spite of the rapidity of the flow. As soon as solidification has taken place the ingots are withdrawn.

The aluminum bronze leaves the factory in the form of rectangular plates, each one weighing 60 to 70 kilos (130 to 150 lb.), which are then reduced to strips from which the coin blanks are stamped.

*From Engineer, London.



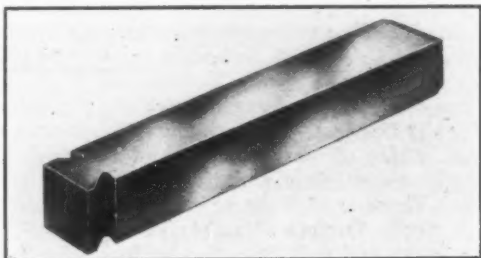
Six Successive Positions in Transferring the Molten Metal from the Ladle into the Ingot Mold. The two are joined by an intermediate section which acts as a runner

Self-Fitting and Cutting Keys

Self-fitting keys known under the trade name of Keytite, which by being driven into the keyway cut their own seats, and intended to save hand fitting as in the case of the usual square keys, are being offered by Smith & Serrell, Central Avenue, Newark, N. J.

One of the keys is shown in the accompanying illustration. A tough chisel stock is used and ground to a size slightly larger than the nominal keyway width. A cutting edge and chip recess are provided near the front end of the key, and ahead of these there is a pilot which is slightly smaller than the nominal keyway width. To install the key, the pilot is entered first with the cutting edge at the side, the key then being driven home with a hammer or a sledge, depending upon the size of the key.

The cutting edge cuts the keyway to fit the key body, the job being done, it is said, in a fraction of the



The Cutting Edges Cut the Keyway to Fit the Key Body. Chip recess and pilot are shown at left end of key

time necessary to hand fit a key. The cut fit is tight, yet not too tight to burst a hub. Oversized keys refit old keyways quickly and thus may serve to keep important machines in operation.

In the larger sizes cutting edges may be provided on both sides and when it is desired to fit top and bottom as well as on the sides, a cutting edge is also provided at the top. Gib keys and other modifications, incorporating the self-fitting feature, can be furnished as required. Keys with heads are available for places where headless keys cannot be drifted out, and many of the larger sizes can be provided with a hole tapped in the end permitting the key to be pulled out by a bolt. Taper keys, with or without heads, are available, although top and side self-fitting keys are recommended on heavy duty work where it is desired that the key fit top and bottom as well as sideways.

August Construction Ahead of Last Year

Building contracts awarded in the 27 Northeastern States during August amounted to \$322,007,000, according to the F. W. Dodge Co. This figure was 46 per cent over that of August, 1921, and only 8 per cent under that of July, 1922. A seasonal decline set in after four months of unprecedented activity and the decline is slight.

The August figures brought the total for the year to date up to \$2,362,872,000, which is not only the largest figure for the first eight months of any year, but is greater by \$7,000,000 than the total for the entire year 1921. Comparing this year with 1921 on the eight months' basis, the year is 58 per cent ahead.

The outstanding feature of the August statistical statement is the increase in industrial plant construction, which amounted to \$67,373,000, or 21 per cent of the month's total. This is the largest monthly figure for this class since March, 1920. One project accounted for \$35,000,000 of this large total, the by-product coke plant of the Carnegie Steel Co. near Pittsburgh. Even omitting this large single project, the remaining amount is greater than any monthly total since November, 1920.

Residential building still maintains the lead in August, with \$100,882,000 worth of contracts, or 31 per cent of the total. Residences for the eight months amounted to \$887,250,000, or 37½ per cent of the total, against 40 per cent for the first six months of the year, a slackening in this item having occurred since July 1. Public works and utilities in August amounted

to \$49,825,000, or 15 per cent; business buildings, \$38,122,000, or 12 per cent; and educational buildings, \$32,055,000, or 10 per cent.

Contemplated new work reported during the month amounted to \$371,249,000.

Business Conditions Still Sound

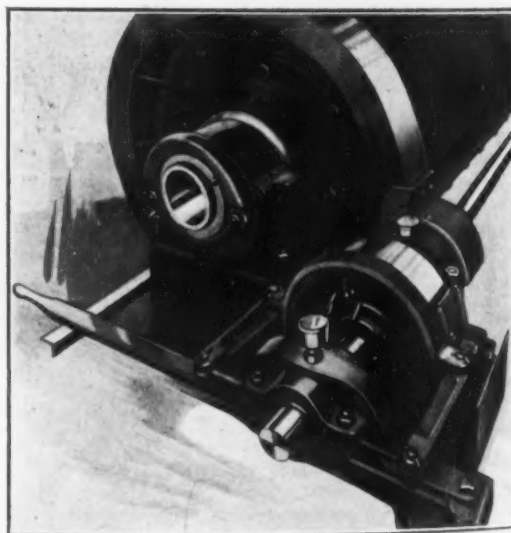
In reviewing the state of industry, the advance sheets of the Department of Commerce for the month of July lay stress upon the comparison with July of last year rather than with June, 1922. The belief is expressed that the very serious labor difficulties through which we are now passing would under many conditions have completely demoralized business. Instead of this, however, real progress has been made in many lines. Thus, the shipment of iron ore through the "Soo Canal" in July was 35 per cent greater than in June and was more than double the figure for July, 1921. The output of crude petroleum, more than 46,500,000 barrels, was 2 per cent greater than in June and, with the exception of last March, shows the greatest total in our history. Consumption of petroleum, exceeding 51,000,000 barrels, is the highest for any month on record.

Production of sheets—blue, black and galvanized—fell off from 86.4 per cent of capacity in June to 72.7 per cent in July. Both may be compared with 19.7 per cent in July, 1921. Shipment of steel barrels dropped from 267,000 in June to 221,000 in July, against 96,750 in July, 1921. Building costs increased in July to 173 per cent of the pre-war figure, against 170 per cent in June. These compare with 204 per cent in July, 1921. The total stock of money in the United States, held outside the Treasury and the Federal Reserve system, decreased from \$4,376,000,000 in June to \$4,337,000,000 in July, the figure in July, 1921, having been \$4,866,000,000. The latest figure represents \$39.47 per head of population.

Clutch and Brake for Tumbling Mills

A combination clutch and brake mechanism for tumbling mills arranged as shown in the accompanying illustration, and intended to contribute to the safe operation of the mills, has been placed on the market by the Whiting Corporation, Harvey, Ill.

With this mechanism a loaded mill can be brought to rest at the proper point for unloading, and without



Combination Clutch and Brake for Tumbling Mills. Control is by the hand lever shown

loss of time. Holding the mill in place by a wood prop or a bolt thrust into the gearing, as commonly done, is always dangerous. With the combination clutch and brake it is impossible for the barrel to turn after the brake is set, even though the barrel is unequally loaded.

It is designed as a simple and fool-proof device and is controlled by a hand lever, the shifting of which toward the mill engages the clutch and starts the mill. To stop the mill, the lever is moved in reverse direction, passing through neutral to the braking position.

NEW THREAD SNAP GAGE

Gages by Sight and Touch—Interchangeable
Rotatable Gaging Elements Used—Lasting
Accuracy a Feature

A new type of adjustable thread snap gage, intended to afford a proper "feel" of the dimension, and an unobstructed view for "seeing" the elements of a screw thread, singly or collectively, and which may be used either as a working or an inspection gage, has been placed on the market by the Johnson Gage Works, Hartford. By elements of a screw thread is meant size, lead, form, roundness and straightness.

An advantage of the snap gage is that the sense of sight as well as that of feeling may be used in checking up the piece being inspected. The relation between the gaging elements and the piece can be determined because light passes through a very small opening and is shut out entirely where contact has been effected. The principles used in the design and construction of these gages vary, the instrument illustrated being a recent contribution to gages of this type.

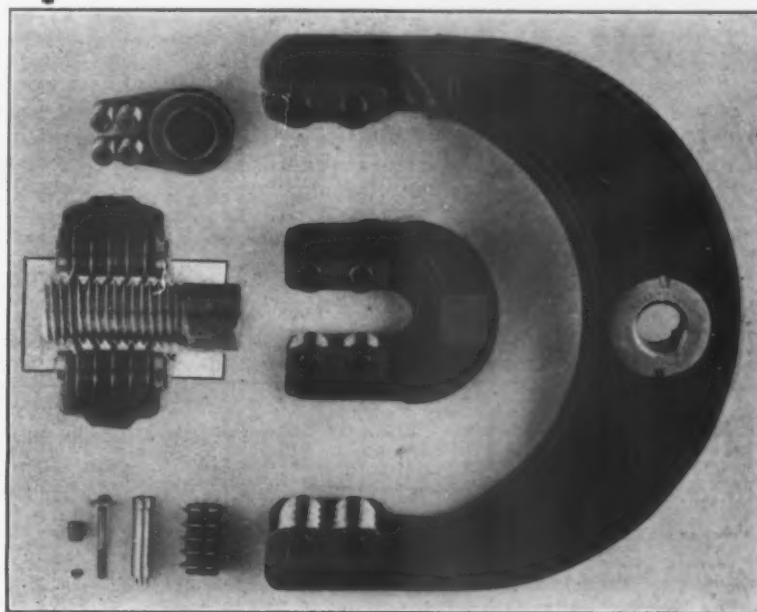
Among the claims for the new gage are that its accuracy is permanent and its adjustment simple and positive. It incorporates a "go" and "not go" limit, and gages single, double, left and right-hand threads. The three styles available are shown in the accompanying illustration. In style A, which is for general use except where a lead check of length is necessary or in pitches coarser than 10, the gage elements are approximately $\frac{3}{8}$ in. long. In style B, the gaging elements are about 1 in. long. Style C is for the A. S. M. E. sizes from No. 0 to No. 12, inclusive.

It may be noted from the illustrations that the gages employ rotatably mounted circular gaging elements, or rolls. The advantage of this principle of construction, as explained by the makers, is that the circular element gives a line contact, affording a proper "feel" of the dimension and an unobstructed view for "seeing" the elements of the screw thread. In rotating, friction and wear is comparatively eliminated, serving to lengthen the life of the gage.

Two sets of gaging rolls are provided, the outer rolls being the "Go" set and the inner the "Not Go"

set. The annular ribs of the rolls are the same in form as the thread to be inspected, and these ribs are spaced to project between every second thread. Functioning without relation to the helix angle of the thread, the gage may be used on left and right hand, single or double threads. By using one rib of the gaging element the pitch diameter of the thread can be accurately determined. By using the entire length of the rolls the form of the thread and the lead can be determined at a glance, and also the presence of any taper detected. A staggered thread or one that is out of round can be detected by rotating the piece while it is engaged. Another feature is that the gaging elements are interchangeable and threads of the same diameter but different pitch can be inspected with the same gage. Work cannot be cramped between the gaging rolls.

Adjustment of the rolls is by rotating the eccentric bushings on which they are mounted, the total adjustment being 0.040 in. The gage is set to a soft master



Adjustable Thread Snap Gages. The larger gage is style B and the one within it style A. Style C is shown at upper left. Details at lower left belong to style B. The gage in use is shown in the insert

or setting plug and after being set the adjustment is locked by a binding screw. A soft plug may be used in the place of a hardened and ground sizer, because, it is claimed, there is no wear in the setting process.

Number of Employees Decreased

WASHINGTON, Sept. 12. — The unsettled industrial situation is held by the United States Employment Service to be largely responsible for a decrease of 1381 employees in the aggregate number employed during the month ending Aug. 31, as reported by 1428 concerns usually employing more than 500 workers each. The decrease in the iron and steel industry under July was only 270, while for metals and metal products other than iron and steel the decrease was 2048. Other decreases were: Vehicles for land transportation, 3676; food and kindred products, 1895; paper and printing, 636; miscellaneous, 603; lumber and its manufacture, 571; textiles and their products, 292, and liquor and beverages, 18. The greatest increase, 3941, was made by the chemical industry. Other increases were: Leather and its finished products, 2244; stone, clay and glass products, 1205; railroad repair shops, 900; tobacco, 268.

The showing was better than many had expected in view of the rail and fuel situation. The report says that building operations are satisfactorily increasing employment. It is pointed out that some industries are suffering from a labor shortage, this including iron and

steel, but that the harvesting season is drawing to a close in Minnesota, North Dakota and Montana, which will cause a surplus of labor. The demand for labor in those States, however, indicates this surplus will be readily absorbed. A strong trend toward increased employment in face of many obstacles, it is declared, signifies a progressive march toward stabilization of industry.

During the first six months of 1922, according to information received by the Department of Commerce, French exports of iron ore reached 4,328,455 metric tons as against 2,666,428 tons during the first six months of 1921. The exports of iron ore from one period to another increased, especially for Germany (1,160,058 tons against 505,702 tons). They remain stationary for Belgium and show an increase for the Saar and the Netherlands.

The Philadelphia Foundrymen's Association resumed its monthly meetings Wednesday evening, Sept. 13, at the Manufacturers' Club, Philadelphia. A part of the program was a memorial service for the late Thomas Devlin, who was president of the association for 15 years.

AUGUST STEEL OUTPUT

**Ingot Production Rate About 30,273,900
Tons Per Year—Daily Output 15,360
Tons Less Than in July**

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies, which in 1921 made 87.50 per cent of the total, had an output in August of 2,214,582 gross tons. This compares with 2,487,104 tons in July and is a decline of 272,522 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year, the output for the 26 working days of August was about 2,530,900 tons or 97,340 tons per day. The July production on the same basis was about 2,842,400 tons or approximately 113,700 tons per day. The August output was at the rate of about 30,273,900 tons per year; in July it was about 35,360,000 tons and in June about 36,000,000 tons per year.

The statistics of the American Iron and Steel Institute since January, 1921, follow in gross tons:

Months	Open-Hearth	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
Total—8 months	8,523,707	2,408,401	16,194	10,948,302
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total—Whole yr.	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
July	2,020,572	464,047	2,485	2,487,104
August	1,807,310	404,379	2,893	2,214,582
Total—8 months	14,759,043	3,428,917	13,112	18,201,072

The August daily estimated output of 97,340 tons compares with 70,019 tons per day in January and with 114,717 tons per day in May.

Large Increase in Imports of Iron Ore

WASHINGTON, Sept. 12.—Incoming shipments of iron ore for July of this year totaled 166,711 tons and for the seven months period ending with July, 1922, aggregated 374,407 tons. These figures compare with 70,040 tons for July, 1921, and 266,186 tons for the seven-month period ending with July, 1921. The increase in imports is ascribed partly to the lower freight rates that prevailed on import shipments than applied to domestic shipments. Since July, however, the rates have become equalized.

Import figures follow:

Imported from	July, 1922, Gross Tons	Total Value	Seven Months Ending July, 1922, Gross Tons
Spain	4,891	\$36,006	20,869
Sweden	54,878	179,032	124,648
Canada	367	1,326	1,321
Cuba	56,275	225,102	133,572
Other countries	50,300	296,250	93,997

Iron and Steel Exports

Figures of the Department of Commerce, supplementing the general statistics covering exports as published on page 602, Sept. 7, show the composition of the shipments to various countries. Thus, of Canada's July purchases, aggregating 48,010 tons, no less than 8630 tons consisted of semi-finished material in the shape of ingots, blooms, billets, sheet bar and skelp. Iron and steel bars and rods, other than wire rods, provided the next largest group, amounting to 6427 tons. Structural shapes, not fabricated, accounted for 5780 tons. There were 3808 tons of iron and steel plates,

3526 tons of black steel sheets, 3101 tons of galvanized sheets, 2369 tons of steel rails and 1899 tons of hoops, bands and strip steel.

Japan, with 37,585 tons, was the second largest customer for American iron and steel. Nearly half of this amount (16,886 tons) was steel rails. There were 8153 tons of black steel sheets, 1339 tons of tin plate and terne plate, 1330 tons of rail fastenings, switches, frogs, etc., 1284 tons of iron and steel bars and rods, 1210 tons of unfabricated structural steel and 2746 tons of scrap.

Steel Corporation's Unfilled Orders

The monthly report of the United States Steel Corporation shows 5,950,105 tons of unfilled business on its books as of Aug. 31, or 173,944 tons more than reported on the books July 31. This increase compares with increases of 140,630 tons in July, 381,303 tons in June, 157,315 tons in May, 602,765 tons in April and 353,079 tons in March, and with decreases of 100,609 tons in February and 26,736 tons in January. The Corporation on Aug. 31, last, had 1,681,691 tons more of unfilled business on its books than it did on Jan. 1, and 1,418,179 tons more than a year ago, and the largest amount for any previous time since March, 1921, when 6,284,765 tons remained unfilled. Following is the unfilled tonnage as reported by months since January, 1920:

	1922	1921	1920
Jan. 31	4,241,678	7,573,164	9,285,441
Feb. 28	4,141,069	6,933,867	9,502,081
Mar. 31	4,494,148	6,284,765	9,892,075
Apr. 30	5,096,913	5,845,224	10,359,747
May 31	5,254,228	5,482,487	10,940,465
June 30	5,635,531	5,117,868	10,978,817
July 31	5,776,161	4,830,324	11,118,468
Aug. 31	5,950,105	4,531,926	10,895,038
Sept. 30		4,560,670	10,374,804
Oct. 31		4,286,829	9,836,852
Nov. 30		4,250,542	9,021,481
Dec. 31		4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747.

Lake Iron Ore Shipments in August

Shipments of iron ore from the Lake Superior region in August were much larger than those in August, 1921. This year there were 9,016,426 gross tons which compares with 4,329,158 tons in August, 1921. This increase over last year was therefore 4,687,268 tons or 108.27 per cent. The totals by ports, with season shipments and a comparison with 1921, are given below:

	August, 1922	August, 1921	To Sept. 1, 1922	To Sept. 1, 1921
Escanaba	900,975	309,111	2,505,105	758,173
Marquette	465,380	129,691	1,314,145	263,105
Ashland	1,134,577	468,283	3,713,633	1,429,308
Superior	2,338,080	917,693	6,703,043	3,508,328
Duluth	2,896,979	1,833,247	8,023,724	6,472,640
Two Harbors	1,280,435	671,133	4,050,289	2,315,918
Total	9,016,426	4,329,158	26,309,939	14,748,072

The increase in season shipments to Sept. 1, 1922 has been 11,561,867 tons or 78.39 per cent as compared with a decrease for the same period a year ago of 20,601,802 tons or 58.27 per cent.

Of the season's total to Sept. 1, the Great Northern dock contributed 22.90 per cent as against 21.92 per cent a year ago. Duluth is credited this year with 30.49 per cent of this season's total as compared with 43.89 per cent a year ago.

Inland Steel Co. Plans

The Inland Steel Co. has filed two plans for record in the office of the county recorder at Valparaiso, Ind., covering 1200 acres of land east of Gary, Ind. The company has been purchasing land on the shore of Lake Michigan, just east of Gary, for three years, and now owns two miles of lake front. No plans for the development of the property have yet been announced, but with the final consummation of the merger with the Midvale and Republic companies, it is likely that a construction program will be launched. At the Indiana Harbor plant of the Inland Steel Co. there is little room left for expansion.

Electric Steel Production of the World

Record of the Leading Countries from 1913 to 1921—
Post-War and Present Conditions—Pig
Iron from Electric Furnaces

BY EDWIN F. CONE

THE world's production of steel in electric furnaces, as represented by the leading producing countries, was partly covered by an article contributed by the author to THE IRON AGE of Dec. 25, 1919, entitled "World's Output of Electric Steel and Pig Iron." It is now possible to cover the years 1919 and 1920 and much of the 1921 production.

Except in two or three countries practically no electric steel was made prior to 1913. In the United States, Germany and France, particularly the latter two, electric furnaces were making steel as early as 1908 and 1909. The industry, however, did not attain any magnitude until 1913. In that year Germany was its acknowledged leader.

1921, has varied with the peculiar conditions existing in each country. Data for the German speaking countries are not yet available, but assuming them to have been proportionate to those in other countries, the total for each of the three years present a strong contrast to those of the years preceding 1919.

Despite the falling off, however, the showing is a good one. The 1919 total for six countries is larger than the 1916 total for eight nations. The 1920 total for six countries, assuming Germany to have made as much as in 1919, exceeds the 1917 output for eight. In 1921, the year of world-wide depression and strikes, probably over 425,000 tons was produced by the six countries including Germany, or a figure nearly equal

Table 1.—Output of Electric Steel Ingots and Castings in the Leading Countries in Tons

	1913	1915	1916	1917	1918	1919	1920	1921
United States	30,180	69,412	168,918	304,543	511,364	384,452	502,152	169,499
Germany	88,256	131,579	190,036	219,700	240,037	55,382	.....	.....
Great Britain	None	22,000	46,709	98,592	115,448	77,000	89,100	27,100
Canada	None	*5,625	19,639	50,467	119,130	15,502	28,301	16,844
Austria-Hungary	26,837	23,895	47,247	47,152	41,163	.....	.....	.....
France	21,124	21,000	44,429	54,031	58,222	42,559	58,080	24,457
Italy .....	.....	22,387	22,376	36,948	†40,000	89,000	†100,000	†140,000
Sweden	2,276	2,187	6,648	10,664	†15,000	.....	.....	.....
Total	168,673	298,085	546,002	822,097	1,140,364	663,895	777,633	377,900

*61 tons in 1914. †Estimated.

Due to the stimulus of the war, the electric furnace industry of all these countries expanded until the peak was reached in 1918, when over 1,140,000 tons was produced against only 168,600 tons in 1913. In this period, however, the United States gradually displaced Germany from the lead, with an output in 1918 nearly equal to that of the seven other countries combined.

The expansion up to and including 1918 varied with each year. The total output in 1915 was about 80 per cent greater than in 1913, while in 1916 it was about 90 per cent greater than in 1915. From 1916 to 1917 the increase was about 50 per cent, and from 1917 to 1918 the expansion was about 40 per cent.

The most striking feature of the growth of this industry up to 1919 is the relative progress of Germany and the United States. In 1913 Germany produced over 50 per cent of all the electric steel then made. Although the United States ranked second in that year, the industry had only just started. Germany and Austria-Hungary were credited with close to 70 per cent of the world's output in 1913. But by 1918 the situation had radically changed. Although Germany had increased its electric furnace production about 2½ times, the United States output had expanded 17 fold, easily leading all nations. Its output was not only twice the two so-called Central Powers, but it was not far from half of the total of all the producing countries.

Another feature of the development of this industry up to 1919 was the rapid growth of the British and Canadian production. In 1913 there is no record of any such industry in those countries, but in the four years 1915 to 1918 inclusive, this British industry had expanded five fold and the Canadian about 21 fold.

The progress of the industry as a whole in the readjustment period since the war, or in 1919, 1920 and

to the output of 1913 and 1915 combined. This is no insignificant achievement.

American Record Since the War

In the United States the course of the electric steel industry in the last three years has been discussed at various times in the columns of THE IRON AGE. In each of the last three years the output has been large, nearly reaching in 1920 the second output in 1918. Even in the disastrous year of 1921, the total of 169,499 tons was over five times the 1913 production and in excess of the world's total at that time. Even in new furnace installations, 1921 showed a net gain of about 9 per cent over 1920.

The most striking features of the 1921 record, however, were the large increase in electric steel castings and the phenomenal rise in the output of electric alloy castings. The following table reveals this in gross tons:

	Total Electric Steel	Total Electric Steel Castings	Total Electric Alloy Steel Castings
1913.....	30,180	9,207	443
1916.....	168,918	42,870	926
1918.....	511,364	108,296	3,076
1920.....	502,152	155,196	11,710
1921.....	169,499	85,095	10,084

The broad expansion in the electric steel casting industry is evident from these figures, the progressive increase having been very large since 1913—reaching the maximum in 1921 at over 50 per cent of the total electric steel production. Still more significant is the fact that last year, of the total output of electric alloy steel ingots and castings, 15.9 per cent was alloy castings. In 1920 this proportion was 6.50 per cent and in 1917 and 1918 only about 1 per cent. The broader use of electric alloy castings, in some industries as sub-

stitutes for forgings, is the explanation. The trend of the American electric steel industry in 1921 demonstrated the firm hold of the electric furnace in the steel foundry.

Broad Expansion in Italy

The outstanding feature among the other electric steel producing countries has been Italy. As shown by Table 1, the Italian electric steel industry has risen from a relatively low position six or seven years ago to a commanding one at present or second last year to the United States. Reliable data indicate that there are at least 180 electric furnaces in the Italian steel industry, among which are several 20 to 25-ton furnaces and about 23 furnaces of the 15 ton capacity. A large number of them are the Heroult type, but the rapid introduction of the Fiat and other Italian types is a feature.

British Post-War Progress

British data recently published call attention to the considerable expansion in number and size of the electric furnaces since 1914. The following table gives the number and size of such furnaces in Great Britain at the beginning of 1922:

Unit Capacity	Number of Furnaces	Capacity per Charge, Tons
5 cwt.....	1	0.25
6 cwt.....	1	0.30
1/2 ton.....	15	7.50
1 1/2 tons.....	2	1.80
1 ton.....	5	5.00
1 1/4 tons.....	1	1.25
1 1/2 tons.....	19	28.50
2 tons.....	20	40.00
2 1/2 tons.....	3	7.50
3 tons.....	18	54.00
3 1/2 tons.....	6	21.00
4 tons.....	5	20.00
5 tons.....	3	15.00
6 tons.....	11	66.00
7 tons.....	10	70.00
7 1/2 tons.....	2	15.00
10 tons.....	8	80.00
15 tons.....	2	30.00
20 tons.....	1	20.00
Miscellaneous (estimated at 1 1/4 tons).....	15	22.50

The data also show that 16 companies had some 21 electric furnaces in their equipment during 1914 and that this score of furnaces ranged within the narrow limits of 1 to 3 1/4 tons per charge. In 1922 there are nearly 150 installations with a range from 5 hundredweight to 20 tons per charge, the majority holding around 2 tons, but 60 or more of them being in the 3-ton class or larger. In 1921 an electric furnace was started in a steel foundry in Ireland, the first one in that country.

Because the circumstances surrounding the operation of electric furnaces are so uncertain, an authoritative estimate of the annual British potential output

has remained largely stationary so far as output is concerned. There was a decided drop in 1919 with a moderate increase in the post-war boom of 1920. The interesting feature has been the marked proportionate increase in electric steel castings, shown by the following table in gross tons:

In 1919 the electric steel casting output was 43.6 per cent of the total; in 1921 this had expanded to 83.2

	Total Electric Output	Total Electric Ingots	Total Electric Castings
1919.....	15,502	8,741	6,761
1921.....	16,844	2,860	13,984

per cent, a still more striking example of the growth of the electric steel casting industry.

German Electric Steel

For Germany the only post-war data available thus far are for 1919. In that year German electric furnaces produced only 55,382 tons against 240,000 tons in 1918 and 88,256 tons in 1913. An explanation is that the partition of Germany as a result of the war removed several important electric furnace producing districts. There are good reasons for believing that it will be some time before Germany can regain a leading position in the world's industry, and that the American and Italian industries will for some years predominate.

No data regarding Austria nor Hungary are available since 1918 and nothing has been found as to Sweden's output.

Pig Iron Made Electrically

Two kinds of pig iron are being made in electric furnaces: The regular reduction of iron ore by means of electricity and coke or charcoal; and the production of synthetic iron or the re-conversion of steel scrap into pig iron or iron castings.

Sweden, Norway and Italy have always led in the former, while France and Canada are the most active in the latter. The war was a great stimulus to this industry, particularly the synthetic iron. Table 2 presents such data as are available covering both kinds of iron over a period of years. The United States during the war made some synthetic iron, but the exact data are not available.

The future of the industry is full of promise. As more normal conditions return in all countries, the use of the electric furnace for making steel will broaden. Statistics for 1922 and later will show a large proportionate increase over 1919 to 1921, because the record of 1919 to 1921 is, under abnormal economic conditions everywhere, a strong contrast to the more meager outputs in the early pre-war years. The 1921 production of five countries was over twice that of six in 1913, or 377,900 tons against 168,673 tons.

Table 2.—Output of Electric Pig Iron in the Leading Countries in Tons

	1913	1915	1916	1917	1918	1919	1920
France	13,691	32,031	7,701	8,835
Sweden	28,753	.....	.....	150,000	.....	.....	59,656
Italy	35,075	44,782	67,059	.....	.....	.....
Norway	3,800	17,298	56,524	.....	.....	.....
Canada	*8,742	.....	6,295	9,007	.....	.....

*160 tons in 1914. †Estimated.

is not advisable. The maximum output was reached in the year 1918. While small, then, this industry has made but little progress. The most striking fact is the following: In 1915 the British electric steel output was 22,000 gross tons, of which only 2000 tons were castings; in 1921, though the total was only 27,100 tons, 16,700 tons were castings, another case of the predominance of the electric furnace in the steel foundry.

Since the war the Canadian electric steel industry

A post-war development in the American industry of wide interest, importance and possibilities is the application of electric furnaces to the iron foundry in refining cupola iron or in the direct melting of scrap. No statistics of the output of electric iron castings are available, but the industry is rapidly broadening. In the steel industry as a whole, not only in the United States but in the other nations here considered, the electric process has established itself as essential in certain fields.

Chromium Alloy Steel Cast Centrifugally

Annealed, It Has the Same Structure as Mechanically Worked Metal,
from Ingots Cast in Stationary Molds—Dendritic
Structure Absent and Grain Structure Small

BY L. CAMMEN

ONE of the most interesting and at the same time difficult problems in steel metallurgy is the production of good high carbon chromium steel such, for example, as is now used for ball-bearing races. The problem has been solved to a large extent by several manufacturers of this material, but only at a cost of a large outlay in time and money devoted to experimental work. The process as used to-day is still fairly expensive and requires the utmost care in order to give the high grade material which the better class of ball bearings manufacturers insist on getting.

In good steel for ball-bearing races the carbon should be around 1.1 per cent and the chromium about 1.5 per cent, although slightly different proportions may give good results with proper handling and heat treatment. When cast in a stationary mold, the ingot has a clearly dendritic structure, with large, coarse grains, and the carbide is almost entirely in solution.

To obtain a finer grain structure, the ingot has to be worked; an 8-in. sq. ingot, for example, is "welded" under a hammer into a 6-in. sq. billet. The forging must be done at a good red heat and with powerful blows, and requires great care and expert attention to temperature and the handling of the hammers, which naturally affects the cost of the product.

At the same time there are certain conditions in the structure of the metal which steel for ball bearing races must satisfy, viz., the grain must be fine, there should be no appreciable excess of cementite, and the cementite in the pearlite should be all "globularized." This latter is very important because, as pointed out by H. C. Ihsen in a recent issue of *Forging and Heat Treating*, steel with the cementite in the spheroidal condition shows excellent wear-resisting properties, as the small globules of cementite, which are very hard, will resist wear, while the soft ferrite matrix gives ductility to the material.

Hitherto the spheroidization of the cementite has been obtained by annealing, and the production of the fine grain by expert hot working (forging) of the billet. That the latter part of the process is not necessary is proved by the photomicrograph herewith reproduced of a ring of high carbon chromium steel taken from a centrifugally cast steel tube. As shown by this, the structure of the metal is purely pearlitic, no excess of

cementite being present; the pearlitic grains are small, notwithstanding the fact that the casting has not been subjected to any mechanical working, either hot or cold, the tube having been simply annealed as cast and cut into rings.

This is, the writer believes, the first instance that a casting in alloy steel has shown the same grain on annealing as a forged billet, and opens up important theoretical and practical possibilities, indicating that it is possible to cast steel in such a manner as to avoid the dendritic ingot structure, a fact which has been repeatedly stated by the late Dr. Henry M. Howe.

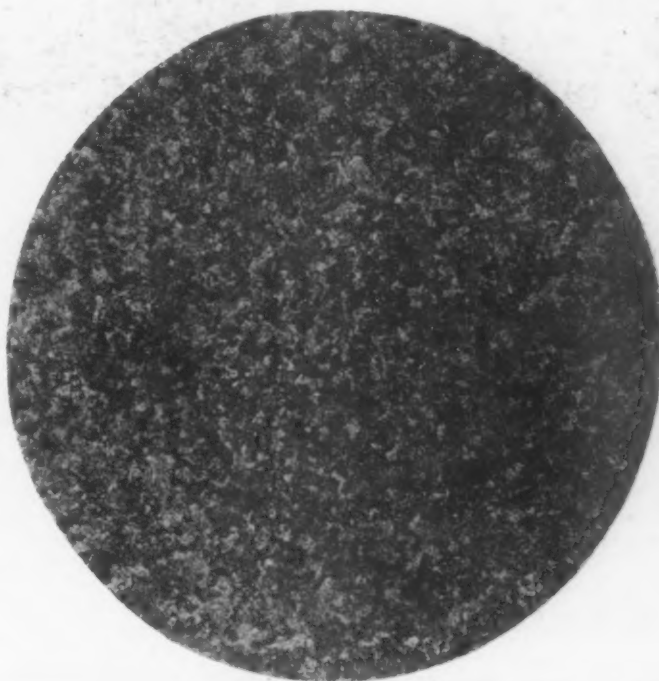
Just why centrifugal casting in this case has given such a fine structure it would be difficult to say at the present time. The metal was cast in a rotating mold having a temperature, at the time of the casting, of about 1700 deg. Fahr. The cooling of the metal was therefore comparatively slow and, in a stationary mold operated under the same conditions,

one would have obtained columnar crystals and a coarse grain structure. And yet, in a spinning mold one gets a fine structure similar to that of a well-forged material.

The most likely explanation is that it is the mechanical stirring due to the rapid rotation of the mold (1400 r.p.m.) that affects the grain size, and possibly also the powerful impingement of hot particles of the metal on the layer next to it outwardly; then, in the process of freezing, this impingement may prevent by purely mechanical means the growth of the crystals and the peculiar ingot dendritism.

In any event, at least for ball-bearing race steel, it is now possible to produce by simple casting and annealing, a material equal in structure to a forging, and thus eliminate the forging operation, a fact which any steel man who has had to carry the forging department payroll, will have no trouble in appreciating.

Despite the fact that the shortage of cement has delayed the completion of many paving and concrete road projects throughout Michigan, building permits for the first week in Detroit reflect optimism. These permits cover 297 new buildings, costs estimating \$5,196,105 comparing with \$1,856,445 for the preceding week.



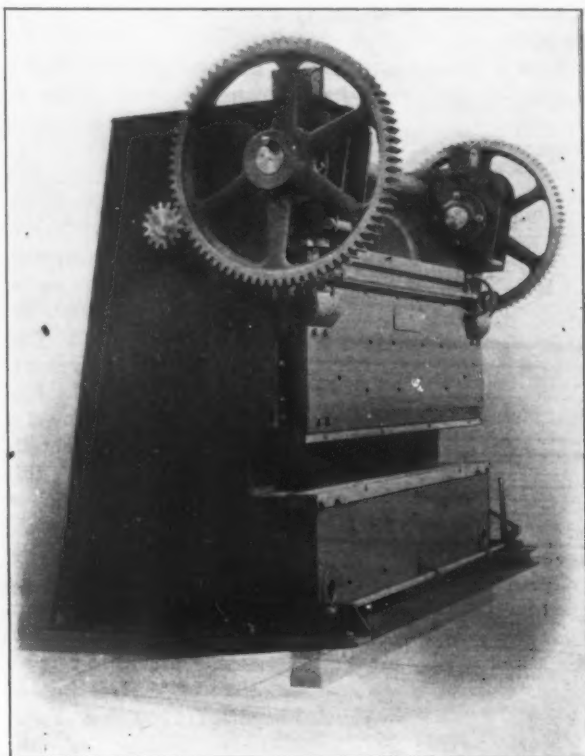
Photomicrograph of High Carbon Chrome Steel, Cast Centrifugally and Heat Treated. Etched in picric acid. Magnification 100 dia.

NEW HEAVY FORMING BRAKE

Steel Plate Construction and Open Throat Housing—Erection Simplified—Speed Increased

A line of all-steel power press brakes in capacities from 50 to 600 tons, for material from No. 16 gage to $\frac{3}{4}$ in. thick, and incorporating new features has been brought out by the Cincinnati Shaper Co., Cincinnati.

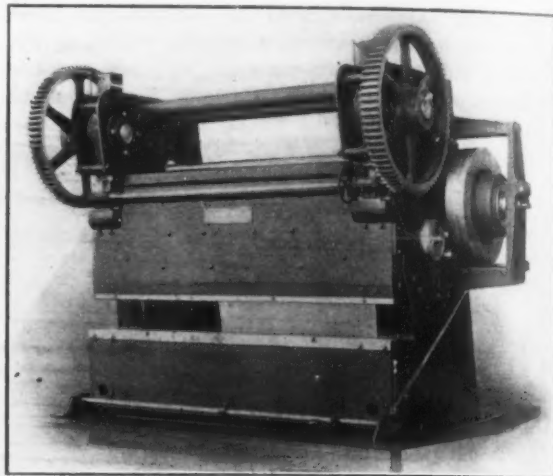
The advantages claimed for the new machine include maximum strength and power with minimum weight and greatly reduced deflection as compared with previous machines of corresponding capacities. Open-throat construction, reduction of the headroom required, quick action and increased operating speed, unusual ease of installation and erection, and a greater



factor of safety than usual are also features emphasized.

The bed and ram are of heavy plates and bars, which with the cross ribs are welded to each other, this construction serving to make a heavy, solid beam of box section with the metal placed where needed. The housings are framed of steel plate with cast steel members interlocked and welded to the plates. These members are provided with heavy trunnions for supporting the bed. A large factor of safety has been used, it is stated, thus to provide additional strength against accidental or excessive overloading.

Automatic sight feed lubrication is provided on all power-driven bearings. The flywheel, clutch, worm and



The Cincinnati Shaper Co.'s Brake for Forming Heavy Sheet Metal and Plates Is Now Built of Steel Plates with Most of the Parts Electrically Welded Together Rather Than Riveted or Bolted. The open-throat construction, with clear working space in front of the machine, and space between the housings in the rear for operating or stacking sheets, are features

factor of safety than usual are also features emphasized.

Outstanding changes in design are the employment of steel plate in the construction and the use of the open-throat type of housing to give a clear extended working space in front of the machine and to facilitate the handling of material. As most bends are made near the edge of the plate, the full length of the die-holding surface can be utilized. Thus, it is pointed out, for most classes of work this type of machine can be rated according to the length of the die-holding surface instead of the length between the housings. This feature is emphasized also as permitting of a narrower and more rigid machine, with a saving in cost and floor space. The space between the housings in the rear of the machine is available for operating or stacking sheets, and work requiring more than one operation may be passed through the machine, the turning of work end for end being eliminated.

To a large extent bolts and rivets have been eliminated by electric welding many of the parts, uniting the component members of the machine in a way that gives the effect of a solid unit rather than that of a built-up section. Where bolts are used in the solid members to draw plates into place, the bolts themselves are welded as well as the plates, so that they become an integral part of the member and remove the danger of working loose.

The driving mechanism is entirely contained within the housings, the latter being shipped with the mechanism assembled, it only being necessary to place them on their foundations and attach the cross members and drive shaft. The machine is shipped as four main

worm wheel in the ram-adjusting device, and the power drive for this, all run in a bath of oil. Shafts are of high-carbon steel, the eccentric shafts being 0.50 to 0.60 per cent carbon forgings with the eccentrics forged integral with them. Main-drive bearings are of special bronze.

A splined trip shaft running the full length of the machine has mounted on it a foot treadle which permits the operator to engage the clutch from the most convenient position. The ram is gibbed endways as well as sideways, which is essential when using the machine as a gang punch.

The machines have been designed to operate at a greater number of strokes than usual, thus increasing productive capacity. When motor driven, the motor is mounted on a bracket attached to the housing, the drive being through a belt held in tension by a weighted idler on the slack side. The flywheel is mounted on ball bearings. Cut gears and steel pinions are used throughout. The clutch, it is stated, has been especially developed for the machine and accessibility and simple adjustment are features. It is of the multiple-disk type, operated in oil and low unit pressures are used in its operation.

Widths between housings are from $6\frac{1}{2}$ to $14\frac{1}{2}$ ft., and the weights of the machines from 18,000 to 120,000 lb.

The Westinghouse Electric & Mfg. Co., which now is working on an order for 120 electric locomotives for Paris-Orleans Railway, France, recently was awarded the contract for the electric control equipment.

The Three-Shift Day at Steel Works

A Special Report by Bradley Stoughton to the Federated American Engineering Societies Puts Cost of the Change Below Common Estimates

IN view of the investigation of the same subject now being made by a committee of the American Iron and Steel Institute, headed by the institute's president, Judge E. H. Gary, special interest attaches to the report on the three-shift day at iron and steel works, which was prepared recently by Bradley Stoughton, consulting engineer, New York. Mr. Stoughton, after a period of plant experience and of consulting work, was for a number of years secretary of the American Institute of Mining and Metallurgical Engineers and is the author of a well-known work on the Metallurgy of Steel. His report on two-shift and three-shift operation was presented on Friday, Sept. 8, at a meeting in Boston of the executive board of the American Engineering Council of the Federated American Engineering Societies. At the same meeting Horace B. Drury presented a voluminous report on "Two-Shift and Three-Shift Operations in the Continuous Industries." Mr. Drury is the author of a paper on the "Three-Shift System in the Steel Industry," which he read before a joint meeting of the Taylor Society and the Metropolitan and Management sections of the American Society of Mechanical Engineers in New York, Dec. 3, 1920. This paper was the result of an investigation Mr. Drury had made for the Cabot Fund, Boston. Mr. Stoughton's report is based on an investigation he carried on, also under the auspices of the Cabot Fund.

Progress in the Direction of the Shorter Work Day

Mr. Stoughton's report consists of 51 closely typewritten pages and the subject is considered under 19 sectional heads. Beginning with historical data, these sections treat of the reasons why the 12-hour day exists in the iron and steel industry, technical considerations in changing from two shifts to three shifts, cost of labor under the three-shift and two-shift systems, labor cost in relation to total costs, handling of peak labor loads at the blast furnace and at open-hearth furnaces, possible economy in rolling mills, consequences that must be realized if the change from two shifts to three shifts is to be a commercial success, and other considerations. Mr. Stoughton's own summary of his report is as follows:

THE 12-hour day is strongly established in the iron and steel industry by long custom, and by its unusual adaptability to the requirements of this industry. However, recent progress in the industry has been in the direction of a shorter work-day, as well as a reduction in the proportion of those men who are on duty for seven days a week.

Peak Loads: An Original Cause for the Persistence of the 12-Hour Day

For some decades past the labor requirement of the iron and steel industry has included some peak loads of great intensity, from the standpoint of physical endurance, or of heat exposure, or both. Between these peak loads will come periods of rest, or of very light labor. This type of labor requirement has been due in part to the special liability of iron and steel furnaces, rolling mills, or accessory apparatus, to break-downs, which necessitate intense activity of the "maintenance men" until they are repaired, with consequent idleness of the other men. Another cause of peak and valley loads is the nature of the operations themselves: For example, during and immediately after the "tapping" of blast furnaces or open-hearth furnaces all hands are subjected to severe labor. The same is true of the charging of the old-fashioned type of open-hearth furnace. This makes it almost imperative to rest thereafter, in the case of all three examples.

Recent improvements in equipment, and the adoption of electrical appliances, have greatly decreased the frequency and the duration of interruptions of the different processes due to break-downs, especially in the rolling mills. Also mechanical and other labor-saving devices have lessened the severity of peak loads due to the processes themselves, both in respect of physical endurance and heat exposure.

Notwithstanding the improvements mentioned

above, break-downs still occur at times, and the labor requirements of some of the processes are still variable. For this last reason, and because of habit due to established custom, it is usual to allow the men periods of rest while on duty, with the result that the 12-hour shift is not always over-taxing, and the 8-hour shift is sometimes too short from the economic standpoint to employ the energy of the men to the best advantage. But this is not always so. When the blast furnace "goes on a bum"; when emergencies arise in other departments; and often when a mill runs without interruption and with unusual vigor, the 8-hour day is long enough for any workman, and it is not uncommon to meet emergencies when all hands are occupied with severe labor and scarcely any opportunities for a few minutes rest for 12 consecutive hours.

In the majority of cases, however, labor at the blast furnaces and open-hearth furnaces is more or less variable and irregular. The more efficient, alert and careful the laborers, the less will emergencies arise, and the less the break-downs. This has been urged as one of the advantages of the 8-hour day, because the men are more alert and efficient.

Labor-Saving Devices Promote the Economy of the 8-Hour Day

To work three crews instead of two crews per 24 hours involves the necessity of increasing the labor costs per day, unless either daily wages per man are reduced, or else any four men, working only 8 hours per day can do as much work as six men working 12 hours. It is obvious that the six men will be almost as efficient and productive per hour as the four men, provided they have so much resting time as to keep them in good condition. Therefore, anything which tends to eliminate peak loads and idle periods increases the relative efficiency per day of the 8-hour men as

compared with that of the 12-hour men, and consequently decreases the added labor cost per ton of working three shifts. Labor-saving devices also reduce the labor cost per ton, by actually eliminating some of the labor; this factor renders less serious an increase of the proportionate labor cost. (For example: If labor costs \$1 per ton on the 12-hour system, and it must be increased by 20 per cent to adopt the 8-hour system, then the increase will be 20c. But if, by means of labor-saving devices, the labor costs are reduced to 60c. per ton on the 12-hour system, then a 20 per cent increase will only amount to 12c. per ton.)

To the last argument objection will be made by some that cost reductions due to labor-saving devices should benefit the stockholders rather than the workmen; but this suggests the general principle stated elsewhere in this report, namely, that the main object is to run the industry economically under competitive conditions. The investigator has found that the majority of managers and executives interviewed believe that if by means of labor-saving devices the plant can be commercially operated upon an 8-hour shift system instead of a 12-hour system, the good of the industry can be better served by eliminating the 12-hour shift than by increasing dividends.

Some Plants Having the 8-Hour Day Are Operating With Commercial Success

The circumstance that already many plants are operating successfully under competitive conditions on the three-shift system, indicates that profits need not suffer, if the change is made with wisdom. Opponents of the three-shift system explain these instances by declaring that they find always some special condition in the case of every plant that employs successfully the three-shift system: Either they are owned by the interest that purchases their product, and so do not have to compete, or else they are making a special product at a special price, or they are geographically removed from the center of competition, etc. But this argument does not always hold; although it applies in many such cases. And, even if it did hold good, it would not prevent the experience of these plants applying generally in the industry, because there are special circumstances operating in every iron and steel district of the country, whereby each has an advantage or disadvantage in competition which is far greater than the labor cost per ton as influenced by this problem. For example, it is well known that the cost of labor which must work at the blast furnaces either on the 12-hour shift or the 8-hour shift is well under \$1 per ton of pig iron. If this sum be doubled it would still be small in comparison with the advantages some companies have because of wise purchasing policy, technical skill, low overhead and ample capital. Judge Gary recently (June, 1922) testified before the Lockwood Committee in New York that the United States Steel Corporation could produce at \$3 per ton less than its competitors.

Conditions to Be Assured in Advance and Conditions to Be Avoided

The experience of those who have made the change from the 12-hour shift to the 8-hour shift with commercial success gives very definite information as to the conditions which must be prepared in advance in order to produce the desired result; they include:

1. Having the equipment in satisfactory condition;
2. Assuring the co-operation of the men in the change;
3. Assuring that the necessary labor will be available.

Likewise this experience indicates what conditions must be avoided if the change is to be made without disaster to the industry. For example, the change should not be made:

1. During a period of labor unrest;
2. After strife, or when bitterness is rife and mutual confidence is lacking;
3. When labor is arrogant or elated by a defeat of the management;
4. Making too sudden changes;
5. Any conditions which lessen the power that management can exert on labor to prevent misuse of the extra hours of free time, tardiness, absence, deliberate shirking, etc., will defeat the commercial benefits of the three-shift system.

The fear has been expressed that if 12 hours pay were given for 8 hours work, the men would soon ask for 12 hours work at the advanced hourly rate. Concerning this there is a difference of opinion, with a rather general agreement that foreign laborers want to make the most money that the work will bring, regardless of how many hours they labor, but that the better class of laborers, and Americans, are satisfied with the shorter day if it brings a living wage. The remedy that has been applied with apparent success to the discontent which some show with the 8-hour shift is a very simple one, namely: Precede the change from 12 to 8 hours' work by time observations to determine how much the crew could produce if working at some greater efficiency; then pay the same hourly rate for 8 hours as for 12, but add a bonus so adjusted that the men will earn the same daily wage as before, provided they work hard for 8 hours. It is said with some positiveness that, if the crew works as diligently as it can for 8 hours, none of them will be agitating for 12 hours' work, and it is also said that the crew itself can be relied upon to see that every man does his work without shirking; disciplinary measures are not necessary for this when a bonus depends on the result. The working of this plan was so good at one plant that the manager declares that 8 hours' work with a bonus will pay for itself.

When wages are paid to the 12-hour men on the tonnage basis, they have an incentive to work hard and it is not reasonable to expect any greater efficiency for 8 hours' work, unless the men are actually more capable on the shorter shift.

Disadvantages of the 12-Hour Shift

In some departments of the iron and steel industry 12 hours' work has been found too long for the men, and it is customary to have "spell hands" to relieve them at intervals. In one case, at least, the crews are actually doubled, and each man works only one-half the time. Where the work is not so continuous, with peak and valley loads, the 12-hour duty is not overtaxing, but here there arises another very serious objection. It is customary for the night men to work 13 hours and the day men 11 hours; in cases of emergency at the furnaces (at the blast furnaces this is technically known as "going on a bum"), the night men, exhausted by 13 hours of taxing labor, often find it impossible to get sufficient rest in their congested homes, especially in hot weather and when the children are at home from school. It is then not a matter of being exhausted by the labor, but of not having sufficient resting time between periods, so they return to their work with lowered efficiency. On the 8-hour shift they always have time to rest, and always some hours for sleep during darkness and when the rest of the family is quiet and when it is comparatively cool.

To deliberately permit laborers to loaf while on duty is wrong from the standpoint of morale and discipline. A few minutes breathing spell after exertion may be wise, but the peak and valley loads of the iron and steel industry require more than this, when operating on the 12-hour shift. We now tacitly accept the sight of men idling, resting, and even sleeping, on duty, as a relic of the days before the severe labor was performed by mechanical appliances, and are apt to forget that the principle of sleeping during paid time is evidence of economic waste. At some plants, sleeping on the night shift is not officially tolerated, but the practice is allowed to go unobserved, when the men are not needed. On the three-shift system rest or sleep during working hours is not necessary, even at the blast furnace.

Advantages of the 8-Hour Shift

Results from working the 8-hour shift have disclosed the following economic advantages, which compensate in part for the extra cost of working three crews instead of two. It is not to be supposed that all of these advantages will be experienced in every case and in every department, but any of them may result when the hours of labor are reduced below 12 per day.

(Continued on page 689)

Bituminous Coal Moving More Freely

Relief Coming to Many Industries—Large Increase in Number of Cars Loaded—Legislation Enacted at Washington

WASHINGTON, Sept. 12.—That industries of the country have already received relief from the fuel and transportation situation is indicated by a growing production of soft coal and the increased movement of cars. While distribution of coal by the Government is to be continued on the strength of legislation passed to that end as well as to prevent profiteering through a system of car distribution, there is no longer any concern as to supplies of bituminous coal. Transportation is the outstanding problem. This, however, seems to be growing less serious, as is evidenced by the action of the Interstate Commerce Commission in exempting all open top cars with sides 42 in. and under in height from being given preference as to coal loading. It is estimated that this adds 34,000 cars for use by industries of the country over and above 62,000 open top cars which did not come under the preference ruling.

The success of the railroads in loading cars with coal is shown in the report of the Association of Railway Executives which says that 167,428 cars were loaded with coal during the week ended Sept. 2. This was the largest number of cars loaded since the strike of miners began on April 1 and also exceeded the preceding week by 49,610 cars. The railroads also are reducing the number of surplus cars, as is shown by the fact that on Aug. 23 there were 120,961 surplus freight cars, representing a decrease of 19,292 cars compared with the total on Aug. 15. Subsequent reports show further improvement.

Movement to Great Lakes Region

Movement of coal to the upper Great Lakes region under the program of the Federal fuel distribution committee is proceeding satisfactorily. It is estimated that a lakeward movement of 800,000 tons was attained last week. The coal from West Virginia and Kentucky districts directed lakeward under priority orders is now arriving at lake ports in considerable quantity and comprises a large percentage of present dumpings at these ports. Lake coal now being loaded is moving almost entirely under its natural Class 2 movement and with only a very limited application of the No. 1 priorities. A problem in the transportation of lake coal has arisen because of delays in the unloading at lower lake ports of cargoes of iron ore from the Northern ranges from boats which carry coal on their return

trips to Lake Superior ports. This delay in unloading ore boats which has been occasioned by deficiencies in the railroad car supply, will be obviated, it is hoped, by the issuance of special permits for the use of cars to transport iron ore.

While enough coal is being mined to take care of the country's current needs, the supply is not yet sufficient to provide for proper storage demands and for the special lake program in addition to general current requirements. Instructions were given last week to the various district coal committees to wind up the affairs of their offices with the completion of priority orders of the committee.

Fact Finding Commission

Legislation for coal distribution and establishing of a fact-finding commission with regard to the coal industry has been passed by both branches in Congress. The Senate fact-finding commission provides for five members to investigate the coal industry and make recommendations. The House bill fixes the membership at nine. By an amendment adopted, the Senate measure calls for separate and distinct inquiries in the soft and hard industries. The general purposes of the two measures, however, are similar. The Senate bill provides that work of the commission shall be begun immediately after its members are named and that a report on the soft coal industry shall be made within five months after the law goes into effect, while the report regarding the anthracite coal industry is to be made on or before July 1, 1923. The commission also is called upon to make a study and report regarding the wisdom or advisability of nationalizing the coal industry. This was the subject of sharp debate in the Senate, as was also the question of Government regulation and control. The other bill covers car distribution for coal shipments and is designed also to prevent profiteering. Arguments were made by some members of the Senate that this legislation is unnecessary and that it would have been better to allow the law of supply and demand to operate, for the benefit of the public, as well as of the coal industry itself. There are those who think that the supply of coal will within a short time be so great, provided the transportation situation is satisfactory, that fuel will be selling under prices agreed upon by the Government and operators.

Moderate Increase in Production in Connellsville Region

UNIONTOWN, PA., Sept. 9.—Observers in the Connellsville bituminous region, with the Labor Day demonstration, in which 10,000 men marched as affiliated with the United Mine Workers, still fresh in their minds, are declaring that the strike in the non-union district here has been broken. Union leaders declare that their cause is stronger than ever, but the appeals being sent out for financial assistance and developments during the past few days hardly carry out that conviction.

Yesterday the tent colony at Filbert folded up their tents en bloc and flitted away—to Cokeburg, where the miners of the colony are reported to have gone to work.

The number of evictions in the region has been increased during the week, an average of nearly 100 eviction warrants a day being issued. Further temporizing, apparently, has been done away with on the part of the companies, which are determined to resume operations at capacity and have been permitting some of their old employees to remain in company houses with

the hope that they would return to work. The situation now apparently has narrowed down to the fact that the companies have given the old employees their last opportunity to return to work and are making places now for men who are coming into the region by hundreds.

W. J. Rainey, Inc., this week prepared to resume on an intensive scale and several hundred imported workers have been sent to their plants in the region. Arrival of one large group was the signal for the explosion of dynamite in a field near Royal, apparently to intimidate the new arrivals. No damage was done.

A trip over the county shows unmistakably that the coal and coke industry is on the upgrade. At night the flare of coke ovens is a welcome sight again and the shipments on the railroads tell the story of increased production with even more effect than do the production figures.

The H. C. Frick Coke Co. alone added 300 ovens to its active list this week. Estimated production of coke

in the Connellsville region during the week ending Sept. 2 was 90,300 tons, an increase of 4200 tons over the preceding week. The production for the week ending Sept. 9 will show an even greater gain.

Operators already are giving serious consideration to the prospect for car shortage. The strike situation has ceased to be a problem insofar as there was any doubt as to the success of the campaign against unionization of the field. The fight put up by the H. C. Frick Coke Co., backed by some of the larger independent companies, has brought its result, in the view of most observers, and the union has again failed in its efforts in the region. Of course the battle is not entirely over and the union leaders will not give up the region without a struggle, for they realize that this will mark the last chance of unionizing the field. The

county has lost several hundred of its miners who have moved to other fields, West Virginia, principally; but many observers declare that the majority of these will return to the Connellsville region when the present tensity has been relaxed. Coming into this field are hundreds of experienced mine workers, some from union fields. The high wage scale, equal to that of the union and without the union checkoff, lures many men.

Many of the mines now operating signed the scale with the union in order to take advantage of the present situation, protect their investments and make a good profit before the bottom drops out of the market as production figures soar. Coal is selling now at \$4.75 and \$5 in this region. Car shortage may hold this price all through the winter, but if there is an adequate car supply, many observers look for a lower price.

Transportation Is the Controlling Factor

WASHINGTON, Sept. 12.—Pointing out that the limiting factor in the supply of soft coal has now become transportation, the Geological Survey says that instead of the 9,400,000 tons suggested by the first report, final returns on soft coal production show only 9,142,000 tons in the week ended Sept. 2. The record of the week was awaited with interest as an indication of the supply to be expected after general resumption of mining under the Cleveland agreement. For the week of Sept. 4-9, because of the Labor Day holiday, the Survey says that the output can hardly exceed 8,700,000 tons. On Labor Day, 10,021 cars were loaded by non-union mines, confirming the experience of other years, that the day counts for a third of an ordinary working day. The double holiday on Sunday and Monday increased the number of empty cars available for placement on Tuesday and on that day 33,085 cars were loaded, the largest number for any day since last March. On Wednesday, Sept. 6, however, loadings dropped to 30,652 cars and on Thursday to 28,238 cars.

It is true that some thousands of miners are still on strike, notably in the Connellsville and Kanawha districts, but the tonnage offered for shipment by the other mines at work will absorb the available transportation facilities, says the Survey. It adds that the demand for coal is active and prices are high. Under such conditions coal is offered for shipment up to the limit of the ability of the railroads to transport it.

Dealing with the by-product and beehive coke situation in August, as affected by the coal supply, the Survey says:

Shortage of coal cut deeply into the production of by-product coke during the month of August. The total output was 1,794,000 net tons, a decrease when compared with July of 692,000 tons, or 28 per cent. The average daily production in August was 57,858 tons, as against 80,182 in July. The ovens operated at 48.9 per cent, or less than half of capacity. Of the 71 plants, 57 were active and 14 idle.

These statistics are based upon reports from 67 plants and include estimates for four small plants not heard from at the date of publication.

The loss in by-product coke was in part compensated for by an increase of 89,000 tons in the production of coke at beehive ovens. A gradual recovery from the strike in the Connellsville district brought the output of beehive coke from 450,000 tons in July up to 539,000 tons. The total of all coke produced—2,333,000 tons—was 10 per cent above the average for 1921, though still 46 per cent short of the 1920 average.

To produce the coke manufactured in August required 3,427,000 tons of coal, of which 2,577,000 tons were used in by-product ovens and 850,000 tons in beehive ovens. The cut in consumption in by-product plants was nearly 1,000,000 tons as compared with July. The districts in which the greatest difficulty was experienced in obtaining coal were Buffalo, Baltimore, Youngstown, Cleveland, Pittsburgh and Chicago. In New Jersey, New England, the South and the Far West no great curtailment of operations was reported through failing coal supply.

Detroit Expects Ample Fuel Supply

DETROIT, Sept. 12.—The consensus of opinion among coal and railroad operators that Michigan will receive an ample fuel supply for current needs seems to be substantiated by the receipt of 3100 cars in Detroit during the past week. Industries in general have not suffered as yet. Dependent upon car supply, Michigan should receive from 60 to 80 per cent of its normal fuel requirements. This will not permit of any reserve stacks being piled. Two of the railroads operating in the State have placed an embargo on open top equipment excepting the low-sided type, and with the improved railroad situation manufacturers are planning production schedules for the remainder of the year. The Ford company's scheduled closing on Sept. 16 seems to be more probable as the date approaches. Suspension of shipment to the Ford plants has been to the advantage of other consumers, as it has released a large portion of the D., T. & I. equipment for general fuel delivery.

Persistent rumors indicate that at least two local automobile manufacturers will cut their production in half by Sept. 15. A general survey of the industry, however, shows a production schedule equalling August figures, with enough orders already placed with parts and accessory manufacturers to keep them busy until Jan. 1. The Detroit Employers' Association figures show 178,000 now employed as against 177,000 a week ago, and indicate that unemployment is below normal.

The recent action of the Interstate Commerce Com-

mission in relieving certain types of open top equipment, heretofore listed as coal carriers, has given contractors and builders some hope that the present shortage of building materials will be relieved.

Sheet quotations show an upward tendency, 3.75c. being the prevailing price on black and 4.75c. for galvanized. Manufacturers are receiving a sufficient supply for their weekly needs, and probably the shortage of sheets is no more acute than many other materials. In general, Detroit industries are receiving current supplies on all materials.

The Lockhart Iron & Steel Co., Pittsburgh, which several months ago acquired the plant of the Sligo Iron & Steel Co., Connellsville, Pa., soon will start operations at the purchased unit. Extensive alterations have been made in the Sligo works, which now has 21 puddling furnaces. J. Porter Gillespie is manager of the Sligo plant.

The force at the plant of the Robbins & Myers Co., Springfield, Ohio, has been increased this week. It is expected that by Oct. 1 the company will have greatly increased its force and that all departments will be in operation.

The Nicholson File Co. and the American Screw Co., Providence, R. I., effective Sept. 5, have advanced wages of all plant employees 16 2/3 per cent, and will operate on a full-time schedule.

German Price Advances Causing Uneasiness

Mills Heavily Booked, But New Building Work Checked
—Dollar the Standard Unit of Reference
Selling on a Sliding Scale

BERLIN, GERMANY, Aug. 25.—Present price increases assume dimensions which make business exceedingly difficult. Even trades which sold at fixed prices, with a certain increase in case of rising wages, are now reverting to prices on a sliding scale altogether. The dollar is now to a great extent the standard to whose fluctuations most trades adjust their prices, having lost all other bases for calculations. In some cases manufacturers and traders are increasing prices in advance of the depreciation. Most of the daily papers have the exchange value of the dollar printed every day in a prominent place and complaints about the spasmodic increase in the prices of commodities, etc., are even by the small shopkeeper retorted with a "Well, but look at the dollar!"

The rapid increase in cost of production has led to a suspension of building at several large works and there is less demand for labor. The increases in the wages in all trades are considerably behind those taking place in the prices of commodities and there is already considerable unrest among the workers and the salaried employees. Wages are about 60 times pre-war standard while foodstuffs alone have gone up to over 100 times pre-war prices.

Most firms in the iron trade have orders to last them till February, 1923. Wholesalers who had a stock of at least a thousand tons in ordinary times have hardly two hundred tons now; and any supply coming in is going straight to firms using the material. The insufficient home supplies have led to greater imports of Luxemburg, Belgian and French iron, which can be had within about a fortnight. The advances in foreign ore and coal has also greatly enhanced the capital requirements and bank credits have to be relied upon to a greater extent, which the banks are very careful in granting. In some industries as much as 50 per cent of the price is asked with the order. As private firms find it increasingly difficult to provide the large amounts of capital involved, and especially in buying raw material, quite a number of them are being transformed into joint stock companies.

Further Industrial Concentrations

Meanwhile concentrations in the industries and increases in capital are assuming great dimensions. The Siegen-Solingen Gussstahl Aktien Verein is increasing its capital to 114 million marks by the issue of new shares. The amount raised in this way (52.8 million marks) is to be used especially for the erection of new works at Gross-Kayna and for other enlargements of the concern.

A new combination similar to the Rhein-Elbe Schuckert-Union, which had been formed under the leadership of Stinnes, is now being developed. It includes the mining concerns of Phoenix and Rheinstahl, the Dessauer Gas Co. and the two electrical firms Sachsenwerk Licht und Kraft A. G. and Max Schorch & Co. A. G. Negotiations to include the General Electric Co. have not been successful. The Phoenix A. G. plans to build a new electric power station, a tube works, a Bessemer plant, and several blast furnaces near Düsseldorf and Hörde. The General Electric Co. (A. E. G.) has acquired the Iron and Steel Foundry of Hartung A. G. in Berlin in order to secure regular supplies of castings to its works.

The great works in the iron industry were prosperous last year which is also shown by the 1921-22 returns of the Becker Steelworks. The gross profit amounted to 123.9 million marks (44.8 million in the previous year), overhead charges amounted to 28.6 (10.3) million marks, and after a depreciation of 60.9 (20.5) million marks, the net profit is 37.9 (15.2) million marks. The capital of the company is 100 million

marks and the reserve fund has been brought up to the same amount. Several other accounts which have figured largely in previous balance sheets have been written down to one mark. A dividend of 30 per cent is being paid.

Mark Exchange the Governing Factor

BERLIN, GERMANY, Aug. 23.—The market continues to be entirely governed by the mark exchange collapse. Prices are ever higher, the demand and the shortage ever greater, and the unwillingness of producers to commit themselves to long contracts ever stronger. The price-rises of the Eisenwirtschaftsbund for pig iron from Aug. 21, and of the Steel Syndicate for its semi-finished and rolled mill products from Aug. 19 have been briefly reported by cable. The following report has merely a historical interest, as prices are now being changed at weekly or ten days' intervals. The prices are in marks per metric ton:

	Aug. 21	Aug. 9	July, 1914
Hematite	16,548	11,317	79½
Foundry iron I.....	13,637	10,481	75½
Foundry iron III.....	13,567	10,411	70½
Siegerland steel-iron	12,472	10,649	79
Spiegeleisen	13,561	11,823	75

These increases in no way injure Germany's ability to compete. They are far more than equalized by the exchange drop. The Eisenwirtschaftsbund has, however, provided for supplements to the basic prices according to future exchange movements and to possible new increases in coal prices and railroad rates. Railroad rates will be increased 50 per cent on Sept. 1; but by then a new increase of the above basic prices is almost inevitable.

To the latest prices of the Steel Syndicate a considerable addition is also inevitable. On Aug. 15 a governmental proposal to reimpose legal maximum prices on the Steel Syndicate's products was defeated by a large majority. Only labor's representatives, and not all of these, supported the proposal. Present prices are:

	Aug. 19	Aug. 8	July, 1914
Ingots	17,800	15,670	82½
Blooms	19,560	17,140	87½
Billets	20,280	17,770	95
Slabs	20,800	18,320	97½
Construction forms	23,700	20,770	110
Bars	24,050	21,070	97-99
Wire rods	25,000	22,700	117½
Thick plates	27,000	23,660	105
Medium plates	30,680	26,880	110
Thin plates	32,980	28,900	125
Thin plates, under 1 mm. .	34,620	30,330	...

The Steel Syndicate's mark prices have of late risen considerably more rapidly than the prices of most other products, and the complaints of manufacturing consumers continue. The producers reply that they are using increased quantities of British coal, which at the present low mark exchange costs three or four times as much as German.

Qualifications of Fixed Price Contracts

Business is extraordinarily active. Western chambers of commerce report that 50 per cent more pig-iron and rolling-mill goods could be sold than is produced. The obstacle continues to be coal and labor shortage. The market for small iron goods and for fine steel articles is sharing in the industrial boom. The centers of these branches, Hagen, Solingen, Remscheid and Velbert, all report having abundance of orders; but working capital is short and the demand for advance payment of one-fourth to one-half of the contract price is the rule. Such contracts as contain fixed prices are qualified with the note "Freibleibend," which means that the producer may refuse to deliver at the agreed-on price if (as with present exchange conditions is inevitable) production cost continues to rise. A great stir has been made by recent decisions of the Leipzig

Court of Appeal freeing manufacturers from their fixed-price contracts on no other ground than that between the contract date and the date of delivery production cost underwent such a rise that contract fulfillment would have caused the seller a heavy loss.

Cutlery Exports

Solingen steel exports exceed the best pre-war periods. It is a fact, however, that exports to America rose abnormally in anticipation of the tariff legislation; and here a heavy decline is expected owing to saturation of the American market. The Solingen industry has always been predominantly an export branch.

When its production of arms, other than luxury weapons, was stopped by the Versailles treaty, it largely went over to manufacture of bicycle parts, hair-cutting machines and tools, though the chief production is still in good-class cutlery.

Exports of Solingen goods classed as fine cutlery averaged annually in 1907-13 4500 metric tons, of the value 28,000,000 gold marks. Exports in 1920 were 4517 tons, valued at 632,000,000 paper marks. Solingen has almost entirely lost its French market. At present rates and present exchange, the hourly wage in the Solingen industry is under 3 American cents. This means extraordinarily low production costs.

FRENCH MARKET STRONG

Deliveries Becoming Extended—Foreign Competition Successfully Met

(Special Correspondence)

PARIS, FRANCE, Aug. 31.—The trade is now in a satisfactory situation, and producers, whose capacity of production is still somewhat restricted, have enough orders on hand to uphold prices. In the northern district, where no blast-furnace has been in operation since the war, because local works preferred to purchase semi-finished products from Lorraine, companies such as Denain et Anzin, Nord et Est, Firminy, etc., are contemplating the reconstruction of their blast furnaces.

Iron Ore.—Present prices of French iron ore at mines are:

	Francs
Briey	15
Thionville	11
Longwy-Nancy	10 to 13
Pyrénées	30

Pig Iron.—Chill-cast foundry pig iron No. 3 P. L. is maintaining its newly acquired firmness. The present average price is 210 to 215 fr. The producers of hematite iron, freed from the control of the Comptoir des Fontes Hématites, have to build up a clientele of their own and are, of course, feeling their way. Very low prices are being quoted. The price of 270 fr. at producing works noted in last week's market was offered by the Société de Paris et d'Outreau and by the Société des Acières de France, the latter selling from an old stock. As low as 250 fr. has been proposed by a company in the center of France, which is outside the area of British competition.

Semi-Finished Steel.—Inland orders are satisfactory and prices are firmer. Quotations are as follows for basic steel: Blooms, 320 to 325 fr.; billets, 340 to 345 fr. From 20 to 25 fr. more is charged for open-hearth material. Delivery is from six to ten weeks. Exports of semi-finished products to Great Britain are reported.

Beams and Rails.—It is believed that orders for beams and rails received in August by the Comptoir Sidérurgique (which controls the inland sales of these products) will make a record for this year. Some beams have been sold at 385 to 390 fr. (Belgian currency) f.o.b. Antwerp.

Sheets.—The market on sheets is very firm. Delivery is now about six weeks for heavy and medium sheets and three months for light sheets. British competition is practically non-existent. Belgian sheets could still be sold in the northeast of France; but the Comptoir des Tôles is making special delivered prices which fully meet that competition. French producers are now able to cover fully all national requirements.

Rolled Merchant Products.—It seems that the question of price is subordinated to the question of delays of delivery. For instance, some works which agreed to deliver within six or eight weeks have obtained prices up to 450 to 480 fr.; while the average price quoted by Lorraine works is only 435 to 455 fr., but with protracted delays in delivery: four or five months for medium specifications and six months and more for small iron bars and flats under 7 mm.

On open-hearth steel merchant products there is a good export demand and orders were recently awarded by the Lorraine and P. L. & M. railroads. The prices now accepted by Lorraine works are: 420 to 440 fr. for large shapes and 440 to 460 fr. for other shapes.

Castings.—Improvement in castings continues. Foundries are well occupied with orders and deliveries are becoming more extended.

American Versus British Rails

Considerable controversy has arisen, according to the *Engineer*, London, over a contract for steel rails for the Glasgow Corporation tramways. The lowest tender, amounting to £15,325, came from an American firm, the lowest British offer being £18,262. The former was recommended for acceptance but, after discussion before the Tramways Committee, it was agreed to refer the recommendation back in order to inquire into the American conditions of labor. Labor members contend that American steel workers are obliged to work 12 hr. a day and are not allowed trade union rights, whereas in Britain the workers have an 8-hr. day and recognition of their unions. Laborists therefore assert that the "fair wage" clause in Corporation contracts is not observed by American producers.

As announced by the cable message on page 566, Aug. 31, the contract was eventually awarded to the United States Steel Products Co.

Fall Meeting of New York Steel Treating

The first fall meeting of the New York chapter of the American Society for Steel Treating will be held Wednesday evening, Sept. 20, in the assembly room of the Merchants Association of New York, Woolworth Building. G. C. McCormick, metallurgist, Crompton & Knowles Loom Works, Worcester, Mass., will read a paper, "Furnace Atmospheres and Their Relation to the Formation of Scale." An illustrated paper on "Duralumin" will also be presented by H. C. Knerr, metallurgist Naval Aircraft Factory, Philadelphia. Both of these papers are part of the regular program for the annual convention in Detroit, Oct. 2 to 7, and the first one was published in the society, *Transactions* for August.

Sheet Bars Sold at \$40 at Youngstown

YOUNGSTOWN, Sept. 12.—A Valley producer of semi-finished steel has sold upward of 9000 tons of sheet bars for September delivery at \$40. Another interest has taken a substantial tonnage of black sheets for next quarter delivery at 3.50c. Several companies are endeavoring to establish a higher differential than 1c. on galvanized grades, owing to higher labor charges and spelter costs.

For the fourth quarter, the steel bar market is stabilizing at 2.15c. to 2.25c. One Valley interest is accepting plate tonnage on a basis of 2.25c. to 2.50c.

Coal prices are softening. Coking coal is now obtainable at \$5 for run-of-mine material, at the mine. Merchant coke price averages around \$12 per ton.

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ESTABLISHED 1855

THE IRON AGE

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Steel Prices and Wages

Labor leaders recently have been boasting their success in keeping up war-time wages in employments in which militant unionism is strongest. Mr. Gompers has declared that "it is safe to say that the full volume of wage reductions, if spread over the working population and averaged up, would amount to less than 5 per cent. * * * This is a stark defeat for employers. It is a magnificent victory for the workers." He does not stop to inquire what sort of a victory it is that causes costs to rise and to that extent reduces the purchasing power of the pay-envelope for workers in industries apart from coal mining, transportation and building. That wages have not been reduced in harmony with the reduction of the cost of living is well attested by recent statistics. But Mr. Gompers evidently did not see what wreckage his boast of only a 5 per cent wage reduction—if it were true, as it is not—makes of all the claims of railroad workers and others that wages must be kept up to meet the rising cost of living.

The latest comprehensive information on the movement of living costs in the United States, as reported by the National Industrial Conference Board, shows that the increase in the cost of living, from the beginning of the war to July, 1922, was 55.6 per cent. The increase in the average wage paid by the steel companies is nearly 80 per cent, comparing 1915 with the rates to-day. These facts show one reason for the increase in the cost of manufacturing steel and prove that the purchasing power of the steel worker's dollar is now much greater than it was in 1915 and immediately before.

Although at the recent rehearings before the Railroad Labor Board in regard to wages of maintenance of way employees, some arguments were submitted to the effect that wage payments by the steel companies in the past year had not been so liberal as those of the railroads, a large buyer of steel sees clearly the present situation. Samuel M. Vauclain, president of the Baldwin Locomotive Works, who recently completed a 10,000-mile trip throughout the country, has given the results of

his observation in an article in *Collier's* of Sept. 9. As to prices of steel, Mr. Vauclain says:

Of more consequence to the country than the strikes and the passing disorders is the price of steel. This is preeminently a steel country. Steel is the basic industry of the nation, and when that great industry operates at a loss, the whole country suffers. A great many things have happened to increase the cost of production of steel—the high railroad rates, the high wages, the high coal prices, the lowering of the number of working hours. The most important factors in raising the cost of production have been the railroad rates and the price of high volatile coal. In the face of these increasing costs, the steel makers, in order to get business and keep their organizations together, lowered prices until now many of them are producing below cost. They thought that they would have to do this for only a little while, but the period has been longer than they looked for, and the steel trade is not prosperous.

Thus a broadminded man who has been in close touch with both railroads and steel plants for many years sees what some labor leaders and some railroad men and attorneys who attended the recent rehearing at Washington were unable to comprehend. Prices of some steel companies have risen so rapidly of late that Mr. Vauclain's statement, which doubtless was written a number of weeks ago, should be somewhat modified to-day. While steel manufacturers are not selling below cost to the extent that was true six months ago, the fact remains that the steel business is not on the sound basis of prosperity that it would be if both costs and selling prices were reduced. It is unfortunate that at a time when deflation was needed, a reinflation movement set in as the result of the "victory" of the coal miners over the farmers, the steel workers and employees in every industry that has had to share in the painful readjustments of the past two years.

The feature of the most significance in the world's electrical production in 1921 is the part played by the electric furnace in the steel foundry. In three countries, the United States, Great Britain and Canada, which had a total electric steel production in 1921 of 213,400 tons, 54.3 per cent or 115,700 tons was steel castings. This represents a large percentage gain in only two years,

the electric steel output of the same three countries in 1919 having been 476,900 tons, of which 31.1 per cent was castings. Viewed as a whole the electric steel industry suffered only a temporary set-back in the world-wide depression of 1921. The decline from 1920 is by no means as sharp as the decline for all countries in pig iron and total steel.

Greater Adaptability of Business

Much assurance as to the success of business in the United States in the next few years is furnished by the adaptability that was exhibited during the war and since, and even now is being shown. In steel the trade has managed to function despite price fluctuations that before the war would have been destructive of all stability and indeed productive of chaos. Steel prices nowadays move in a way that would have been considered violent before the war. Three of the ten years before the war showed a difference of 30 cents between the high and low price of nails, and one showed a difference of only 5 cents, while the average divergence, between the high and low points of each year, was only 21 cents. In merchant steel bars the years having great price swings showed differences of \$7 a ton and the average difference was only about \$4 a ton. Nowadays a single market change of 20 cents a keg in nails is not regarded as formidable. In bars an advance or decline of \$5 a ton is not considered much, while at a given moment there may be a difference of \$5 a ton or more between the cost of deliveries that are not very widely separated.

The great upward movement in steel prices in 1909 carried the average of all rolled steel products over a range of scarcely more than \$5 a ton, while the average advance in 1912 was less than \$7 a ton. Yet these were distinctly "major" price movements. Towards the close of each movement warnings were being sounded that should the mills advance prices any more they would destroy their demand.

The difference between conditions then and conditions of late is not that the dollar is inflated, so that a movement in dollars means less; for if the dollar is inflated the inflation cannot be claimed to be more than 50 per cent, and 50 per cent added to pre-war price fluctuations would not produce figures comparable with the fluctuations that are now common.

In all the history of American railroading before the war there was only one serious freight congestion—that which extended approximately from October, 1902, to March, 1903. In its time it was regarded as a calamity. The railroads were humble in their apologies, arguing that this was the first and possibly it would be the last. Since late in 1916 we have had several periods of traffic congestion and we are now faced with prospects of another.

Strikes before the war were numerous, but they were not so serious as those we have had since. They caused loss to the strikers and to their employers, but they did not injure the public as have recent strikes, nor did they interfere

with the conduct of general business in any way at all comparable with the troubles business has had thrust upon it in the past three years.

If these disturbances, these handicaps to the orderly conduct of business, had been threatened before the war the menace would have been considered exceedingly serious. With the greater adaptability business has acquired they are simply regarded as obstacles to be overcome. They do not produce chaos or cause business to stop.

In gaging the future of business in the light of the "troubles" we have had and are likely still to have, a new and longer unit of measuring has to be used. It requires much more than formerly to make an impression on business, which has grown more alert and more able to bear trouble.

Economics and Psychology

Since the armistice all thinking men have directed their attention more than formerly to economics. Possibly we are still "a nation of economic illiterates" as we were dubbed about six years ago, but striking an average of all the people we are not altogether so illiterate as we were, and it may be suggested also that some foreign countries have not exhibited as much economic sense as might have been attributed to them.

Some individuals, possibly many, seem to have a feeling that this new interest in economics is more or less peculiar to them. They are not altogether certain that they have not acquired a sort of hobby, which they must be careful not to ride too hard or at least to exhibit too freely. These men should feel reassured. The interest in economics is general. It is no fad. The interest is the natural development of circumstances. There has been a great change in conditions and economic laws are working out results. Before the war the working was slow and almost invisible. Men could adapt themselves to such gradual changes as occurred without giving much thought to the underlying causes.

We are taking more interest in economics, as we ought to do and indeed must do, and no doubt we are making progress. But in connection with our increased study of economics a note of warning needs to be sounded. That is, that the aspect of psychology that involves considering what is in other men's minds must not be neglected.

In not a little of the current talk on economic subjects is an insistence that other men ought to obey economic laws that the speaker undertakes to lay down. Impatience is exhibited that some men are conducting themselves as they are. They are flying in the face of Providence, so to speak, in flouting these newly recognized economic laws, and punishment is on the way.

It may be, however, that these supposedly ignorant people know more about economics than appears. They may have motives of their own. They may have moderately good reasons to hope that they will escape direct punishment. Economic laws work out certain results, but never has it been shown that they punish each individual in the precise measure of his failure to

square his conduct with the general economic good.

It is found, for instance, that it would be for the general economic good for bricklayers to lay 1000 bricks a day instead of 500. It does not follow that the individual bricklayer deserves punishment. Study shows that a machine may be operated with seven motions when the operative takes ten. He may have reason for preferring the ten, particularly if he need not select the same ten each time. There are too many coal miners but it does not follow that it is the duty of any particular individuals to get out.

Further Advance in Centrifugal Castings

There are new evidences of progress in the centrifugal casting of metals. In THE IRON AGE of Aug. 31 an article described the production in a Scottish plant of a class of iron castings by this process which are apparently not made anywhere else. Piston ring sleeves, engine cylinder liners, even chilled wheels and rolls, are being cast, having properties quite different from those of sand-cast products. It is evident that there are large possibilities in the application of the centrifugal process to small castings of suitable section, besides straight pipe as in the De Lavaud process.

Attention is called to the author's comment on the centrifugal production of nickel-chromium chilled iron car wheels. The advantage of alloy iron car wheels, sand cast, was brought out at the June convention of the American Society for Testing Materials in 1921. Doubtless unusual properties would be secured by the centrifugal casting of wheels of this composition, due to the difference in structure, for one thing. This may be ultimately one solution of the chilled iron wheel problem in the United States.

Of equal interest and importance, in another field, is an article on another page describing the casting in a centrifugal machine of a high-carbon chromium steel, probably the first account of the successful production of an alloy steel casting by the centrifugal process. The chief feature is the attainment directly of a structure which only the most careful and time-consuming forging or rolling, with subsequent heat treatment, can develop in the same kind of alloy steel cast as an ingot. The centrifugally cast chromium steel, unworked and heat treated, is at least equal in structure and properties to similar metal treated by present methods. To this is added the possibility of producing an alloy with higher carbon and chromium than can be secured in ordinary working by present methods.

American engineers will learn with surprise that the London Electric Railways Co. is about to have five experimental all-steel cars built by as many different car-building concerns. Especially will this surprise be manifested in such cities as New York, Boston and Philadelphia, where the underground service has been performed for years by steel cars. So great has the superiority of the steel car been found, especially in its resistance to buckling in a collision and in its relative immu-

nity from fire, that no other type now is permitted in trains underground in American cities. Some wooden or partly wooden vehicles still persist among the smaller cars, operated singly, as in the dense population area of Boston, but even on elevated structures the tendency is to get away from such construction as rapidly as possible.

CORRESPONDENCE

Further Federal Legislation to Control Industrial Relations

To the Editor: Apropos of your editorial, "The Railroad Injunction," may I submit some suggestions for Federal legislation to decentralize and control organizations of capital and labor. The leading motives of such legislation should be:

1. The recognition of the fact that co-operative effort, both by owners of capital and by workmen, is a legitimate outgrowth of a normally developing modern civilization.

2. For the common good, methods of safeguarding the public against the arbitrary and selfish use of the power gained by co-operation must be devised.

Public opinion already has rendered an adverse verdict against unrestrained combinations of capital. The present methods of restraint, such as the Sherman and Clayton acts, etc., should be carefully examined and revised along the line suggested above in (1).

Public opinion also has rendered a favorable verdict on the abstract question of the right of workmen to organize for common defense, etc. The arbitrary and selfish use of the power of association by workmen is also a menace to the public welfare. This has been strikingly illustrated by the action of some of the railroad unions and the United Mine Workers of America. Some practical methods must be adopted, therefore, to prevent the abuse of power by labor organizations.

The law encourages the association of men with capital in the form of corporations. It should also, by definite legislation, encourage the organization of the employees of a corporation into a "company union," which should be incorporated and thus made responsible for its acts.

The suspension, discharge, or other discrimination against an employee because of his relation to an association of fellow workmen should be prohibited under proper penalties.

The law aims to prevent two or more corporations from effecting combinations so powerful as to menace the common welfare. The law should also prevent like powerful combinations of the employees of two or more corporations, which would also menace the common welfare.

Certain industries, such as railroad companies, coal mining companies, and public utility companies, should be declared to be vested with a public interest.

For the purpose of adjudicating disputes between corporations vested with a public interest and incorporated company unions, there should be established one or more Federal industrial commissions. These commissions should have the usual powers of a court to call for witnesses, papers, etc., and after hearing both parties should render a decision as to the merits of the controversy.

This decision, however, should be purely advisory and should not be legally binding on either party; the idea being that such decisions will merely serve as an impartial guide in the formation of public opinion, which must be depended upon to bring sufficient pressure to bear upon the party refusing to accept the decision of the commission.

No incorporated company union of employees of public interest corporations should engage in a strike, nor should any such corporation lock out its employees,

until the questions at issue shall have been submitted to a properly constituted Federal tribunal. Proper penalties should be provided to be enforced against the individual at fault.

PUBLIC INTEREST.

Suggestions to American Buyers of British Coal

To the Editor: It is estimated that nearly one and a half million tons of British coal has been purchased for importation to the United States, of which slightly more than one-third has reached its destination. Thus, only recently actual results as to its burning and heat-giving qualities have been ascertained, and already there is much complaint regarding the unsuitability as well as the poor quality of some of these coals. I have made inquiry as to the grounds of such complaints, because ordinarily a well chosen British coal should give in most cases almost the same satisfaction as a well chosen American coal.

On investigation among various consumers, including railroads, public utilities and industrial companies, I was more than surprised to find that, while the purchases have been made on analyses, no particular attention was given to other considerations which are highly important. No coal producing country in the world possesses such a variety of coals as Great Britain. There are the Welsh district, Scottish district, the Newcastle district, Yorkshire, Lancashire, Monmouthshire and other smaller districts; and it has not been appreciated in some cases that these districts have coals of differing qualities, ranging from high volatile by-product to low volatile steam coals.

A good many purchases have been made stipulating Welsh steam, or Monmouthshire steam, or Newcastle steam, with a certain percentage of volatile and sulphur, on the supposition that such coal should be equal to American coals of similar analyses coming under the classification of pools, these pools more or less clearly defining the general qualities of the coal. This is not the case.

Furthermore, a good many of these purchases have been made on the basis of two-thirds screened and one-third small, with the idea, I presume, of equaling coal that on this side would come under the category of run of mine. To my mind a great mistake has been made in purchasing such a mixture, as the majority of Continental railroads, public utilities and industrial companies, when purchasing coal from Great Britain, will only accept screened coal. The British coals, constituted as they are and worked in many cases in thin seamed mines, require the screening to improve the quality, and it has been customary for decades back to screen all coals with the exception of the high volatile. In fact, up to 25 years ago, the small coals were heaped at the pit's head because no use was found for them. Only with the introduction of special ratings and other mechanical improvements did these small coals become a marketable article. Therefore, by purchasing two-thirds large (otherwise screened) and one-third small, you get a poorer coal and yet have to pay for the cost of the screening.

My main purpose in writing is to suggest to purchasers of British coals not only to be careful that they do not purchase coals designated merely as from a given district but that they insist on coal from certain named collieries; furthermore, to insist that shipments be accompanied with colliery certificates duly attested by an American consul. British coal shipped to foreign countries has long been purchased on colliery certificates, which stand both for quality and quantity.

The average consumer in this country is at a disadvantage in not knowing which of the British collieries produce the quality suitable for his purpose. But a letter to any of the chambers of commerce in the respective coal districts, stating the writer's requirements and what he has been accustomed to use, would bring forth full information as to the best quality of coal to purchase. If consumers here continue to purchase by specifying simply steam or gas coal from a certain district, they are bound to have difficulties and in many

cases find their coal unsuitable for their equipment. Those who do the stoking may have the best intentions, but will not be able to get satisfaction out of the coal. I know of cases in which the users of imported coal were actually unable to raise steam with it. While of the same volatile content as the American coals to which the buyer had been accustomed, they required entirely different handling under the boiler.

There is an impression that with the reopening of the mines in this country there will be no longer a necessity for purchasing British coal. I hold a different viewpoint. Although the productive capacity of the American mines may be even larger than the increased demand caused by the shortage owing to the strike, I am confident that the railroads will not be able to carry sufficient quantities to cope with such an extreme pressure as is caused by the shortage, owing to the long duration of the strike. Consequently within a month or so, especially with the approaching winter months, the pinch will be felt again and of necessity further large purchases will have to be made, principally as to hard coal. And although Great Britain would not be able to spare any consequential quantities of anthracite, yet there are certain dry coals, or so-called bastard anthracites, which will be a better substitute than the higher volatile coals.

The main mischief has been done so far by having bought coals somewhat indiscriminately merely on volatiles, without considering how the coal burns and how it requires to be stoked. The whole position can be improved by applying proper methods of handling the coal under a boiler according to the actual quality, in which case it will be necessary not only to know from what district the coal comes but also from what colliery in the district the coal was drawn.

Where it has been ascertained that the coal is absolutely unsuitable, it might be possible to arrange with consumers who could utilize such coals, as there are many consumers who are in the same dilemma. Some of them require just the coal the other has and yet cannot use, or if he is able to use it, is not able to get the fullest satisfaction out of it. Consumers should avoid the purchase of mixed cargoes of certain analyses, under which category the merchant would be left to consider his profits rather than the more important point whether the coals will be suitable or not. It is a mistake to consider dollars per ton as the most important factor, since a saving of 25c. a ton on the purchase might easily mean the losing of \$2 or more a ton in results achieved.

To say that it would be difficult to exercise such careful discrimination would be far-fetched, as large buyers like the Swedish State Railway or other Continental lines will buy British coals by the millions of tons, as will gas works and industrial companies. They will all tell you they have bought British coals for decades by collieries and never by districts; have bought screened coals and never thought of purchasing a mixture of two-thirds large and one-third small.

R. C. MARTENS.

New York, Sept. 8.

The New Fiat Electric Furnaces

To the Editor:—In the article which appeared in THE IRON AGE, July 20, p. 151, "New Fiat Electric Furnace," it is stated that the Fiat should produce 1000 tons a month of steel ingots. This should be corrected, as the production was 1000 tons a month of steel castings for automobile and truck parts, which the Fiat produced in extraordinary numbers during the war for the Italian army and also the allies. The electric foundry for steel castings was of the greatest assistance in developing the campaign.

In another place the article mentions "carbon" electrodes. As the readers must have already understood by a consumption so small as 2.85 kg. per ton of steel, this did not refer to carbon electrodes, but American graphite electrodes.

DR. ALFRED STROMBOLI

Turin, Italy, Aug. 8.

ENGINEERS AND 8-HOUR SHIFT

Action at Boston on Reports Dealing with Continuous Industries

BOSTON, Sept. 9.—The Executive Board, American Engineering Council of the Federated American Engineering Societies, held a two-day meeting Sept. 8 and 9, at Hotel Bellevue, this city. The most important matter under consideration was the acceptance of two reports, one prepared by Horace B. Drury, industrial investigator and formerly of the faculty of Ohio State University, and the other prepared by Bradley Stoughton, consulting engineer, New York, formerly secretary American Institute of Mining and Metallurgical Engineers. These reports deal with the two-shift day and the three-shift day in continuous industries, and are based on two lines of inquiry extending over a period of nearly two years. The one directed by Mr. Stoughton embraces the iron and steel industry. While much of the report is favorable to the three-shift day, Mr. Stoughton raises some questions, including the following:

If men are given 12 hours' pay for 8 hours' work, will they not still be discontented or dissatisfied and agitate for 12 hours' work at the advanced rate? There seems to be good reason to fear such a result. Further, do the men want the 8-hour shift? If this question really means, Do the men want the 8-hour shift with 8 hours' pay at the present hourly rate? then I believe there can be no question that they do not. The present daily wage of \$3.60, which is for 12 hours' work at 30c per hour, is as low as even "common labor" can live on in America and support a family.

The first question can be answered; the second one means that the "common labor" must be paid the same daily wage as at present, and some technical or commercial compensation found in the conduct of the operations, if possible. If it is not possible, and if profits at present cannot stand the extra production cost, then the 12-hour shift must be continued until a change occurs.

The investigations were made possible, under the direction of the council's committee on work periods, of which H. E. Howe, Washington, is chairman, by financial co-operation from the Cabot Fund, Boston. Presentation of the original reports was made to the council at Pittsburgh in May, at which time they were referred to a committee for editorial changes.

The question of accepting the reports developed rather vigorous opposition from a small minority of the council. Both reports subsequently were accepted and authorized to be published, with a few editorial corrections. The opposition took the stand that the American Engineering Council of the Federated American Engineering Societies should not accept the responsibility of these reports, which are sure to have a far reaching influence. It was argued that adverse criticism of the council would be invited, which might lead to unpleasant notoriety. It was brought out during the discussion that a group of ministers some time ago issued a report on working conditions in steel mills, which is the laughing stock of engineers the country over. It was intimated that this latter report might indirectly influence the public attitude toward the reports under consideration. It also was suggested that the two reports are not of an engineering nature, but more along social reform lines.

J. Parke Channing, New York, a member of the committee on work periods, as well as other members of the council, vigorously supported the reports. They stated that the nature of the data collected during the investigations is such that it cannot be set down in decimals and figures, which the opposition contended should constitute a basis for an engineering report. It was urged that the study ran into human as well as engineering problems, and that human problems cannot be tabulated.

As to the council's responsibility for the publication of the reports, it was contended that they recommended nothing, holding strictly to the findings of the investigators. Also that every man serving on the committee on work periods is an engineer, competent of judging the merits of the reports. In addition, the constitution and by-laws of the American Engineering Council of the Federated American Engineering Societies justifies that organization's sponsorship of the

reports under question. Mortimer E. Cooley, president of the federation, as well as dean of engineering schools, University of Michigan, who presided at the session, during the discussion of acceptance turned the chair over to Calvert Townley, New York, in order that he might support acceptance. [Summaries of the reports appear on other pages.—EDITOR.]

Dean Cooley made the announcement, following the meeting, that he was about to start on a nationwide tour to arouse the engineering organizations of the leading industrial centers to greater zeal in the public service. A chief purpose of Dean Cooley's mission will be to familiarize American engineers with the findings of the council's committee on work periods. "The 12-hour day in continuous industry must go," said Dean Cooley. "A nationwide survey has shown conclusively that three shifts of eight hours each is desirable both for capital and labor. The eight-hour day makes for more harmonious labor relations, tends to safeguard management, and unquestionably brings about more contented workers and happier homes. Millions of men, women and children will profit when all continuous industries abolish the 12-hour shift."

PRODUCTION INCREASING

Improvement in Blast Furnace and Mill Operations in Mahoning Valley

YOUNGSTOWN, Sept. 12.—Iron and steel production is expanding in the Youngstown district, as coal shipments reaching the Valleys increase in volume. Improvement is reflected in both blast furnace and rolling mill operations. With the blowing in of the 600-ton stack of the Trumbull-Cliffs Furnace Co. at Warren, scheduled for resumption Sept. 13, 21 of 47 furnaces in the Mahoning and Shenango Valleys will be pouring. Mattie blast furnace at Girard of the A. M. Byers Co., Pittsburgh, will also be blown in at an early date.

Pig iron production is therefore approaching 50 per cent, as compared with an average of less than 30 per cent in August. Most of the hot metal being produced is used in steel making, comparatively little being sold in the merchant market.

Iron and steel makers show considerable optimism over fourth quarter business and production, one interest predicting a 70 per cent average for the final quarter of 1922.

Fifty-nine of 66 open-hearth furnaces in the Mahoning Valley are melting; independent operations in the Valley are estimated at 70 per cent. Three of four Bessemer plants are active, while 104 of 113 sheet mills were scheduled at the beginning of the week.

Production of merchant iron is being retarded by the scarcity and high cost of coke. In the Shenango Valley one merchant furnace is in blast, but the output is absorbed as hot metal by a producer of ingot molds and castings.

Sales executives reported undiminished demand for the lighter steel products.

Steel Works Electrical Engineers Meeting

CLEVELAND, Sept. 12.—The Association of Iron and Steel Electrical Engineers began its sixteenth annual convention in the Public Hall in this city yesterday with a registration of over 1100 for the first two days. Monday was devoted to a business meeting and reports of committees. Starting to-day technical sessions will be held until Friday noon. The annual banquet takes place Thursday evening and inspection trips will be made to Cleveland plants on Friday afternoon. A large exhibit of electrical equipment is being shown in connection with the convention.

The Norwalk Iron Works Co., South Norwalk, Conn., a builder of compressors, has merged with the Automatic Carbonic Machine Co., Peoria, Ill., the plant and equipment of which is being moved to South Norwalk. Through this consolidation the company will be able to supply, in addition to its standard ammonia equipment, a completely developed line of carbonic gas equipment for refrigeration and ice making.

METAL SCHEDULE CHANGES

House Recedes on Most Rates—Foreign Valuation Prevails—Zone Plan Abandoned

WASHINGTON, Sept. 12.—The metal schedule of the tariff bill as finally reported to-day from conference is left in the form in which it passed the Senate in all important respects. Almost invariably the House conferees receded, as was done with regard to the vast proportion of the rates and provisions throughout the bill.

The bill, which now is before the House, after which it will go to the Senate for final passage, retains the duty of 1c. per lb. on manganese ore and 1½c. per lb. on ferromanganese and continues the ferroalloy section in other respects as acted upon by the Senate. In the general steel section of raw and rolled products, the Senate rates also are carried with few exceptions of minor importance.

Alloy Steel Rates

One important change, however, made regarding alloy steel consists of a change in verbiage in paragraph 305, which provides that additional duties shall be applied to all alloy steels instead of only to those in paragraph 304 relating to ingots, blooms, billets, bars, etc. This change was made by inserting the word schedule instead of referring to the single paragraph.

On anti-friction balls and rollers, the conference retained the Senate specific duty of 10c. per lb. and adopted a House amendment carrying an additional duty of 45 per cent ad valorem instead of 55 per cent as proposed by the Senate. The House bill imposed a duty of 20 per cent American value on welded cylindrical furnaces and iron or steel tubes not specifically

provided for, while the Senate bill provided 30 per cent foreign value. The House receded with an amendment making the duty 25 per cent foreign value. The House American value duty of 25 per cent on flexible metal tubing and rigid electrical conduit and the Senate foreign value duty of 35 per cent were changed to 30 per cent foreign value. Senate rates on chain were adopted except on chains less than ¾ and not less than 5/16 in. in diameter, and less than 5/16 in., the House rates of 2½c. and 4c. per lb., respectively, being accepted. The conferees compromised on a duty of 35 per cent instead of the Senate duty of 40 per cent on the House duty of 30 per cent on spiral nut locks and lock washers. The House receded with an amendment restoring the classification on metallic magnesium and metal magnesium scrap, but making a duty of 40c. per lb. and 40c. plus 20 per cent on magnesium alloys, tubing, wire, etc.

Compromise on Magnesite

A compromise was reached on magnesite, the Senate rates being increased and House rates lowered. The duties finally determined upon are equivalent to \$11.50 per net ton on dead burned and grain, or 23/40c. per lb.; \$12.50 or ½c. per lb. on calcined, and \$6.25 or 5/16c. per lb. on crude. The Senate rates on graphite were adopted except that the conference accepted a House amendment changing the rate on crystalline flake to 1½c. per lb. Senate rates on fluorspar were accepted. A number of compromises were made regarding cutlery, clocks and surgical instruments.

The House receded on the American valuation plan and accepted the Senate foreign valuation plan and the provisions for flexible tariff rates to be declared by the President under certain conditions. The Senate receded on its provision for the establishing of foreign trade zones.

EXPORT TRADE INACTIVE

Rail Orders Still Largest Item — Tonnage for Bolivia Bought—Chilean Railroads to Inquire

NEW YORK, Sept. 12.—Export trade to all markets, including Japan, is at an extremely low ebb. While business is still appearing from Japan, it is almost entirely from Governmental sources and the purchases are largely confined to rails. The black sheet business, which it was hoped would continue as large as it was last year, because of the municipal ordinances calling for fireproof roofs throughout the country and other uses, is at a minimum. This dullness in light gage sheets is partly explained by large stocks on hand, said by some to amount to as much as 80,000 tons and also by the fact that the Japanese are now purchasing British and Continental sheets, which are lower in price.

The recent tender of the Imperial Government Railways, which called for 4700 tons of 75-lb., 20-lb. and 16-lb. rails has been awarded to Suzuki & Co., New York, and the Government railroads have issued a new tender calling for 4000 tons of 60-lb. rails. Beside these official rail purchases, American export houses report that they are bidding on some small tonnages for private interests. One of these calls for about four miles of 25-lb. rails to be shipped c.i.f. Takao. The South Manchuria Railway Co., which, some time ago, received bids for furnishing about 700 tons of tie plates, has not yet awarded the contract to an exporter. Work on the hospital building for this railroad at Dairen, Manchuria, which it is estimated will cost about \$1,500,000, will probably be started about Jan. 1. The contract was awarded to George A. Fuller of the Orient, New York. This company, which is working on several buildings in Tokio, Japan, generally purchases the major part of materials for construction work in the United States.

Tenders will be issued some time in October by the Chilean State Railways, 141 Broadway, New York, for furnishing locomotive tires, steel axles, plates and similar equipment. Request for bids on the annual rail requirement of the Chilean railroads will probably be made in December. The Ulen Contracting Co., 120 Broadway, New York, executing a contract with the Bolivian Government, which calls for the building of about 204 kilometres of railroad, has closed on the preliminary tonnage of rails for the work, amounting to about 60 per cent of the total amount needed. This tonnage of 8250 tons with accessories was placed with the United States Steel Products Co., which received 2250 tons, and with a Belgian mill, which will roll the remaining 6000 tons. Immediate delivery was given by the American seller, the rails being shipped to the north end of the road. The Belgian delivery was slightly extended but the price was lower. This is the extent of the rail purchases of the company for this year.

Between 12,000 and 13,000 tons of 60-lb. rails will be needed for completion of the railroad, but these will be purchased later. The Bolivian Government has announced that bids will be accepted on the construction of the remainder of the Potosi-Sucre Railroad, totaling about 60 miles, 40 miles of this road, from Potosi to Betanzos having been constructed under Government direction.

The most recent bids received on the project for electrification of the railroad from Durban to Pietermaritzburg, South Africa, will be opened in October. Bids for furnishing materials and performing the engineering work have been obtained and rejected several times during the past year. There have been some American bids submitted.

The Machinery Club of Chicago will hold its annual picnic at Thatcher's Woods, River Forest, Ill., Sept. 16.

Iron and Steel Markets

OUTPUT GROWING

Fifteen Blast Furnaces Resume in the Week—Steel Supply Easier

Railroads Pressing for Car Deliveries—Steel Works at 60 Per Cent

Blast furnace resumption by steel companies are coming more rapidly than in the first week of September. Pittsburgh, Youngstown, Cleveland, Chicago and eastern Pennsylvania report 15 furnaces started in the past week, and indications are that all the August loss of 28 furnaces will be made up by another week or ten days.

Such an increase in pig iron production points to a correspondingly easier situation in the near future in respect to steel deliveries, subject to the handicap of insufficient car supply for the moving of certain rolling mill products.

The embargoes announced by various railroads in the past week have had no important effect as yet on steel shipments. Ample supplies of cars are still available for coal shipments and thus far the steel industry has not been directly affected by priority rulings.

One factor of uncertainty grows out of Washington proposals for co-operation by coal producers in furnishing tonnages for use as required to keep prices in check. Since steel makers are being pressed by railroads and car builders to supply steel for cars and locomotives they are making every effort to increase output.

In the past week special efforts have been made to expedite the delivery of railroad steel. With much equipment in bad order, the railroads are urging car works to make deliveries, since new equipment will operate for a considerable period without needing attention.

Locomotive works also are expediting deliveries on the unusual volume of business they have booked recently. Late orders include 75 locomotives for the New York Central and 50 for the St. Louis & San Francisco. A considerable item in the machine tool trade is a \$500,000 list of shop equipment for the Missouri, Kansas & Texas.

The Steel Corporation ingot production this week is at more than 60 per cent of capacity and several independent companies are again close to 60 per cent, with prospects of some further increase.

August steel ingot output, as expected, fell off much less from the July rate than did pig iron—about 25 per cent for pig iron and only 11 per cent for steel. As against a 35,000,000-ton yearly rate in July, the August rate was nearly 31,000,000 tons, and to-day it is nearer 32,000,000 tons.

Buyers of steel are disposed to limit their purchases at present prices, which still show a considerable range, in view of the Steel Corporation's evident purpose to continue its conservative policy.

An important mill in the Chicago district has had in the past week the heaviest inquiry that has come to it in 18 months. However, agricultural buying in that market, which began on a moderate

scale some weeks ago, has gradually fallen off as prices have advanced.

Eastern bar iron manufacturers have advanced their price \$3 per ton, or to 2.25c., Pittsburgh. About 500 tons of Belgian steel bars have been brought in at Philadelphia for sale at about 1.90c., Pittsburgh.

Significant of an easing situation is the Ford Motor Co.'s release this week of a portion of the steel sheets it had held up at the mills when it published its plan to close down on Sept. 16.

Connellsville coke supply increases slowly, so that pig iron output at merchant furnaces can make only a gradual gain in production. The trend of pig iron prices at Pittsburgh is still upward, but in other sections the advance seems to be arrested and in eastern Pennsylvania a prominent steel company is selling foundry grades on a basis of \$32, or \$2 below the recent prevailing price. The leading Virginia interest, which expects to blow in a furnace in a few days, has announced a schedule based on \$32 for No. 2 plain, but has made no sales. The Birmingham market seems to be settling to \$25, although Southern basic has sold as high as \$27.50. Deliveries from the South continue to be extremely slow.

The scrap market is in commotion. There is the cumulative effect of the abnormal use of old material at steel works since pig iron became so scarce, added to the scant offerings of railroad scrap during the strike, also the long curtailed production of scrap at many metal-working plants. In an excited market prices have advanced by \$1 to \$3 a ton in the past week.

Of 8250 tons of rails bought by Bolivia, Belgium will supply 6000 tons. The remainder for early shipment was placed in the United States. Somewhat later upward of 12,000 tons additional will be needed.

THE IRON AGE composite price for pig iron has advanced \$1 to \$31.52 per gross ton, the highest figure since the first week of 1921. Four weeks ago it was \$26.77; one year ago it was \$19.81 per ton.

Pittsburgh

Demand for Steel Still Exceeds Supply—Pig Iron Price Trend Upward

PITTSBURGH, Sept. 12.—Blast furnace resumptions in this and nearby districts have been so numerous lately as to give rise to hopes of an easier supply situation in steel in the near future. Practically all of the furnaces which have gone on—and the total for the western Pennsylvania, Wheeling and Valley districts since the settlement of the coal strike a little more than two weeks ago has been 18 with three more ready to start—have been steel works stacks. In another week, it is expected, the number of active will be close to the peak reached early in July of '26, out of a total of 139 furnaces.

So far, the increased production of iron has not caused any weakening in the steel situation. On the contrary, the demand, though showing less urgency in a number of lines, still exceeds the supply and because of that condition, prices can be based on costs,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Sept. 12, 1922	Sept. 5, 1922	Aug. 15, 1922	Sept. 13, 1921
No. 2X, Philadelphia...	\$34.64	\$36.14	\$33.14	\$20.84
No. 2, Valley furnace...	35.00	35.00	30.00	21.00
No. 2, Southern, Cin'tif...	29.05	29.05	24.05	23.50
No. 2, Birmingham, Ala...	25.00	25.00	19.50	19.00
No. 2 foundry, Chicago*	32.00	32.00	30.00	22.00
Basic, del'd, eastern Pa...	32.00	32.00	27.25	19.25
Basic, Valley furnace...	32.50	30.00	26.00	19.00
Valley Bess., del. Pitts...	34.77	34.77	28.76	21.96
Malleable, Chicago*	32.00	32.00	30.00	22.00
Malleable, Valley	33.00	33.00	28.00	20.00
Gray forge, Pittsburgh...	36.77	34.77	30.00	21.96
L. S. charcoal, Chicago...	36.15	36.15	33.15	33.50
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:

O-h. rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh	40.00	38.00	35.00	29.00
O-h. billets, Pittsburgh	40.00	38.00	35.00	29.00
O-h. sheet bars, P'gh	40.00	40.00	35.00	30.00
Forging billets, base, P'gh	45.00	43.00	40.00	34.00
O-h. billets, Phila	45.17	45.17	42.67	35.74
Wire rods, Pittsburgh	47.50	45.00	42.00	38.00
Cents				
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.70
Light rails at mill	2.00	2.00	1.90	...

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.575	2.42	2.325	1.95
Iron bars, Chicago	2.25	2.25	2.15	1.75
Steel bars, Pittsburgh	2.00	2.00	1.90	1.65
Steel bars, Chicago	2.10	2.10	1.90	1.85
Steel bars, New York	2.34	2.34	2.24	2.03
Tank plates, Pittsburgh	2.00	2.00	1.90	1.65
Tank plates, Chicago	2.30	2.30	1.90	1.75
Tank plates, New York	2.34	2.34	2.34	2.03
Beams, Pittsburgh	2.00	2.00	1.90	1.65
Beams, Chicago	2.20	2.20	1.90	1.80
Beams, New York	2.34	2.34	2.24	2.03
Steel hoops, Pittsburgh	2.75	2.75	2.50	2.15

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 12, 1922	Sept. 5, 1922	Aug. 15, 1922	Sept. 13, 1921
Sheets, black, No. 28, P'gh	3.35	3.35	3.15	2.75
Sheets, galv., No. 28, P'gh	4.35	4.35	4.15	3.75
Sheets, blue an'd, 9 & 10	2.50	2.50	2.40	2.20
Wire nails, Pittsburgh	2.60	2.60	2.40	2.90
Plain wire, Pittsburgh	2.35	2.35	2.25	2.60
Barbed wire, galv., P'gh	3.15	3.15	3.05	3.55
Tin plate, 100-lb. box, P'gh	\$4.75	\$4.75	\$4.75	\$5.25

Old Material, Per Gross Ton:

Carwheels, Chicago	\$23.50	\$22.50	\$20.50	\$13.50
Carwheels, Philadelphia	21.00	20.00	17.50	17.00
Heavy steel scrap, P'gh	19.50	18.50	17.50	13.50
Heavy steel scrap, Phila	19.00	15.50	15.00	11.50
Heavy steel scrap, Ch'go	18.50	17.50	15.75	11.00
No. 1 cast, Pittsburgh	21.50	19.00	19.00	17.00
No. 1 cast, Philadelphia	21.00	19.00	19.00	17.00
No. 1 cast, Ch'go (net ton)	22.00	21.50	18.50	13.25
No. 1 RR. wrot, Phila	21.00	18.50	18.00	15.00
No. 1 RR. wrot, Ch'go (net)	18.00	17.50	14.50	11.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt	\$11.00	\$10.00	\$14.00	\$3.25
Foundry coke, prompt	12.50	12.00	15.00	4.25

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.12½	12.25
Electrolytic copper, refinery	13.75	13.75	13.75	12.00
Zinc, St. Louis	6.37½	6.25	6.15	4.20
Zinc, New York	6.72½	6.60	6.50	4.70
Lead, St. Louis	5.60	5.55	5.55	4.40
Lead, New York	5.95	5.90	5.90	4.60
Tin (Straits), New York	32.12½	32.50	32.12½	26.75
Antimony (Asiatic), N. Y.	6.25	5.37½	5.25	4.45

Composite Price, Sept. 12, 1922, Finished Steel, 2.412c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 83 per cent of the United States output of finished steel	Sept. 5, 1922, 2.412c. Aug. 15, 1922, 2.255c. Sept. 13, 1921, 2.279c. 10-year pre-war average, 1.689c.
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Composite Price, Sept. 12, 1922, Pig Iron, \$31.52 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Sept. 5, 1922, \$30.52 Aug. 15, 1922, 24.77 Sept. 13, 1921, 19.81 10-year pre-war average, 15.72
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which are not receding much, with labor scarce and not especially efficient and scrap prices advancing with much rapidity.

Pig iron prices still show an upward tendency and with coke so scarce as to prevent the blowing in of merchant furnaces, relief from the present scarcity is not believed to be immediately ahead. It is a question whether furnaces dependent upon Connellsville coke could find accommodation even if the prices of iron advanced sufficiently to permit the payment of present coke prices. The strike in that region still is far from being over.

The past week has seen further stiffening in semi-finished steel prices and this is generally considered to forecast further upward revisions of prices of finished products. The claim is set up that with sheet bars at \$40, the base gage of black sheets should bring 4.25c. to net a fair profit. Some makers have advanced their prices to \$5 to \$7 a ton above the Steel Corporation bases. Premiums also are common on hot-rolled flats. An advance of \$3 per ton has been made by all of the independent makers of wire products. In these several changes, the Steel Corporation has not yet fol-

lowed and its price policy generally is a conservative one. Suggestions persist that tin plate must command more money to offset the higher producing costs.

Ample supplies of cars still are available for coal shipments and the steel industry as yet is unaffected by the priority regulations. The Connellsville region, however, on account of the curtailed production, is not demanding many cars and since union mines have not reached capacity operations, no real strain has been placed upon supplies, especially as there were available not only the railroad cars in storage, but those privately owned. Car shortages for fuel movements are looked for and makers of wire products and other steel products, which for sake of safety are moved in box cars, find it necessary to resort to the use of low-sided open top cars, because of the scarcity of box cars.

Blast furnace resumption have caused a demand for coke that has sent the price up \$1 a ton. Advances of 50c. to \$3 are noted in scrap.

Pig Iron.—Although lacking in activity, the market has lost none of its recent strength and it is freely predicted that prices will go still higher before they take a turn in the other direction. It is believed that

production of the steel works furnaces which recently have gone on will be needed by the producers themselves, since reserves were quite generally exhausted while the furnaces were down and any surplus iron that is made will be put into reserves. Merchant furnaces probably could make iron profitably even at the current cost of \$11 per net ton at ovens for beehive oven coke, but this does not mean that many such furnaces will go in immediately, because the strike in the Connellsville district is not yet over and the question of price is unimportant by comparison with lining up tonnages. Getting the men back to work is preliminary to getting coke supplies and when that can be accomplished is merely a guess. Little has been done here in the past week outside of a sale of 2000 tons of basic iron to an Allegheny Valley sheet maker at \$32.50, Youngstown. This sale sets the market on basic at that figure. A Valley independent is negotiating a sale of 20,000 tons of basic. We quote foundry iron on the lower silicons at the same price as No. 2 grade for the reason that it is not available at less.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$32.50
Bessemer	33.00
Gray forge	35.00
No. 2 foundry	35.00
No. 3 foundry	35.00
Malleable	33.00

Ferroalloys.—Interest in the tonnage alloys is low, despite the increasing rate of steel works operations. Prices show little change. Spiegeleisen is \$1 per ton lower at \$38 furnace, for average 20 per cent material and \$37 for 16 to 19 per cent, this being due to the fact that production is gaining owing to a better coke supply. British ferromanganese still is being offered for future delivery at \$67.50, c.i.f. Eastern seaboard, but purchases are light since present indications are that the new tariff bill will be a law before shipments can be landed. There has been a rather good demand for ferrotungsten in this district lately, with several sales of foreign material at 45c. per lb. contained tungsten.

We quote 78 to 82 per cent ferromanganese, \$75 c.i.f. Atlantic seaboard for domestic; British, spot, \$70 to \$72.50; British, future, \$67.50; German, 76 to 80 per cent, \$67.50 to \$70. Average 20 per cent spiegeleisen, \$38 furnace; 16 to 19 per cent, \$37 furnace; 50 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$50.50; 11 per cent, \$53.80; 12 per cent, \$57.10; 13 per cent, \$61.10; 14 per cent, \$64.10; silvery iron, 6 per cent, \$39; 7 per cent, \$40; 8 per cent, \$41.50; 9 per cent, \$43.50; 10 per cent, \$45.50; 11 per cent, \$48.80; 12 per cent, \$52.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$3.66 per gross ton.

Tin Plate.—Demands of container manufacturers in connection with the pack of perishable foods have been pretty well satisfied and since current requirements are neither extensive nor pressing, the supply situation is comparatively easy. Costs, however, are much higher now than in the second quarter of the year and as they promise to remain rather high in the final quarter, prices are firm. On really large orders, slight concessions from the "official" quotation of \$4.75 per base box, Pittsburgh, are being made, but instead of 15c. to 25c., this is now a matter of only 5c. to 10c. per box. Unless there is a drop in steel prices, or some other means of cutting costs, an "official" quotation of \$5 per base box is likely by independents on first quarter, 1923 business. The leading interest is silent on the matter of future prices.

Cold-Finished Steel Bars and Shafting.—There has been no relief for most makers in this district in the matter of supplies of hot-rolled bars and while the demand for cold-finished bars is not of high proportions, it is sufficient to sustain the recent advance to 2.50c., base, Pittsburgh, for carload lots. The principal demand is from the automotive industry, makers of agricultural implements and machine tools still being negligible buying factors. Ground shafting is unchanged at 2.90c., base, f.o.b. mill for carloads.

Hot-Rolled Flats.—The market is at a minimum of 2.75c., but on orders calling for early delivery, 2.85c. to 3c. has been obtained and some makers will not consider narrow widths at less than 3c., and have quoted as high as 3.25c. Only small tonnages, however, are moving at the higher prices.

Cold-Rolled Strips.—With no easing in costs of hot-

rolled material, there is no inclination on the part of makers of cold-rolled strips to consider less than 4.25c., base, Pittsburgh.

Nuts and Bolts.—The recent advance is well maintained and with the demand fairly active and no signs of an immediate easing in prices of raw material, it looks as though present prices soon would be minimums. Discounts are given on page 683.

Rivets.—Recent price advances do not seem to be affecting demand and the new prices daily are becoming more firmly established. With bars at 2c., base and rods at \$47.50 per gross ton, it is claimed that present rivet prices are low enough. Prices and discounts are given on page 683.

Track Fastenings.—We make no change in prices this week. The market, however, is firm and there is a brisk demand for small spikes in connection with coal mine resumptions incident to the ending of the strike. Prices are given on page 683.

Billets, Sheet Bars and Slabs.—Producers still are hesitant about naming prices on fourth quarter tonnages because of the uncertainty as to costs. With blast furnace and steel works operation increasing, it is probable that costs will be less than they are at present, but this is not assured, since the coal strike is not over in the Connellsville district and transportation conditions now seem likely to interfere with plant operations. The market at present is entirely a spot affair and business is generally at sellers' valuations. Sales of several thousand tons of sheet bars recently have been made in the Youngstown district on a basis of \$40 and that is as low as they can be had here. One local maker will take Bessemer sheet bars at \$40, but does not want open-hearth bar business at that price. At the moment, Bessemer steel appears to be a little more plentiful than open hearth. Billets have sold at \$40, Pittsburgh for 4-in. soft steel and there also have been sales at \$42, mill, outside this district and of foreign steel at from \$47 to \$50, mill. The Steel Corporation is out of the market on all forms of semi-finished material.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at \$40; 2 x 2-in. billets, \$40; Bessemer and open-hearth sheet bars, \$40; slabs, \$40; forging billets, ordinary carbons, \$45 to \$47, all f.o.b. Youngstown or Pittsburgh mills.

Iron and Steel Bars.—As a selling price, 1.90c., Pittsburgh, steel bars have disappeared even for indefinite delivery. The Steel Corporation has not yet succeeded in making headway against its obligations and can take little business for delivery as promptly as most buyers desire. Independents are quoting from 2c. up to 2.25c. for reasonably early delivery. The Carnegie Steel Co. priority scheduling of its mills still is in effect. Concrete bars rolled from billets are available at 2c. from independent mills. Iron bars are firm.

We quote steel bars rolled from billets at 2c. to 2.25c.; reinforcing bars, rolled from billets, 2c. to 2.25c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.45c. in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—No trouble now is experienced by makers of light rails rolling them from new steel in getting 2c., base, and some business with coal companies has been done a trifle higher. As high as 2.25c., base, is quoted, but sales at that price are few and small.

Iron and Steel Pipe.—There has been no material letup in the demand for merchant pipe, notably in the butt welded sizes, but due to better operating conditions resulting from the improved fuel situation, some progress is being made toward reducing obligations. Oil country and line pipe business is rather slow, because supplies of oil above the ground still are excessive and so long as this condition exists, prices must remain low and drilling be restricted. A move to definitely limit new drilling is reported to be afoot, but so far has not found general adoption. Business in wrought iron pipe seems to have suffered as a result of the advance of a few weeks ago. Discounts are given on page 683.

We quote 25 to 45-lb. sections, rolled from new steel, 2c. to 2.25c. base; rolled from old rails, 1.90c. to 2c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Steel Skelp.—The market is quotable from 2c. to 2.50c., but only the Steel Corporation customers are

getting accommodation at the lower figure and then only for limited tonnages and not for specified delivery. Independent makers are not quoting less than 2.25c. and claim ability to obtain 2.50c. for prompt tonnages of narrow grooved skelp.

Wire Products.—Late last week, independent producers announced new prices, which as compared with those previously in effect and to which the Steel Corporation subsidiary still is adhering in a nominal way, show advances of \$3 per ton. This puts the independent market at \$2.75, base, per keg, Pittsburgh for nails, \$2.50, base, per 100 lb. Pittsburgh, for wire and \$2.25 base, per count keg for coated nails. One independent company, however, is quoting the latter product at \$2.35. A cut of 1½ points in the discount on woven wire fence has been made by most independents, but one has cut the discount only one point. To jobbers, the discount on this product now is 70½ per cent off list, as quoted by independents and 72 per cent off list, the latest price of the leading interest. Discount to retailers is 2½ points less. The new prices generally have not yet found much basis in sales, because most makers owed considerable tonnage at lower figures and distributors naturally are specifying against these orders instead of buying. There has been, however, a strong effort to get the mills to take on more business at the old prices. Shortage of box cars has forced two makers here to resort to the use of open top cars, with tarpaulin covering, and one is making acceptance of shipments in this fashion a condition of early delivery. Prices are given on page 683.

Wire Rods.—Sales of ordinary soft rods have been made here at \$47.50 for prompt shipment and that now is as low as any can be had, although the Corporation continues to quote \$43. The latter, however, is taking no business. No prices yet have been named on fourth quarter tonnages. Whether they will be at the basis of recent business or below depends largely on whether the upward slant of steel works operations is checked by transportation difficulties and labor shortages. Both factors are operative now, but the mills are figuring that cool weather will bring about a better supply of help.

We quote No. 5 common basic or Bessemer rods to domestic consumers, \$47.50; chain rods, \$47.50; screw stock rods, \$52.50; rivet and bolt rods and other rods of that character, \$47.50; high carbon rods, \$54.50 to \$57.50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Structural Material.—Deliveries on plain steel to fabricating companies still are laggard, but improvement is expected in this direction, since new demands are lighter and a better operation of blast furnaces and steel works should be helpful to production. Building costs, notably in labor, are rising rapidly and the development is causing the postponement of some projected work. Here, the contractors find it necessary to pay bonuses to get men so they can live up to their contracts. The men are seeking the bonus jobs and neglecting others. The prevailing market on structural shapes is 2c., but on small tonnages for early shipment, premiums up to \$5 a ton are demanded. Prices are given on page 683.

Plates.—Demand is not very heavy in this district, but it looms big in comparison with production and supplies. The market is quotable from 2c. to 2.50c., Pittsburgh, but independents are not interested in less than 2.25c. Tank builders are not getting many new inquiries. Prices are given on page 683.

Boiler Tubes.—Iron boiler tubes appear to be priced too high to sell well, but a satisfactory business is reported in steel boiler tubes, notably in seamless tubes, in connection with recent big locomotive orders. Discounts are given on page 683.

Sheets.—With the sheet bar market strong and sales of several thousand tons reported at \$40, Youngstown, there is a disposition on the part of independent makers to seek higher prices. Several already are quoting blue annealed at 2.75c., base, Pittsburgh, black at 3.75c., base, and galvanized at 4.75c. base or \$5 to \$7 a ton above the Corporation prices. With sheet bars at \$40, it is claimed that still higher prices must prevail, since it is figured that the cost of making No. 28 gage black sheets would be more than 3.70c. The Corporation sheet-making subsidiary is holding at third quarter prices, but is not letting customers specify

beyond their usual average requirements. This company is operating at 65 per cent of capacity this week, a gain of 5 per cent, chiefly in the tin plate mills, due to a better supply of Bessemer sheet bars. Independent companies still are running above 80 per cent, the average for August having been about 85 per cent. Prices are given on page 683.

Coal and Coke.—The market on furnace coke is no longer quotable at less than \$11 per net ton at ovens. That price has been paid on the requirements for two months of one furnace which will soon be blown in and on other sales, the total of which is 30,000 tons. It is hard to figure a much lower price, since beehive oven production cannot increase much so long as the men in Connellsville district insist on union recognition as a condition of their return to work and once the production does rise it will be wanted by furnaces which will be going in. Not much by-product coke is available for open market sale, as steel works stacks require about all of the production. Foundry coke also is stronger, not now being available at less than \$12.50 per net ton ovens. The coal market is rather soft, as supplies are now ample for all demands. Gas coal lately has been at \$5.50 at mines, against \$6 previously, while coking coal is right around \$5 and steam grade at \$4.50 for tippie coal and as low as \$4 from wagon and stripping mines.

Old Material.—Prices on most grades have advanced sharply since a week ago, due to increased interest on the part of melters, which has emphasized the shortage in the available supply and encouraged dealers to make still higher appraisals on their yard holdings. Actual sales, however, have been made at advances of from 50c. to \$3 or more a ton. Some sales of heavy melting steel were made last week at \$19, but this week, bids of \$19.50 by melters have found no takers. Our specialties, such as railroad knuckles, couplers, springs and angle bars, as much as \$23 recently has been paid, while the market has advanced on sales \$1 a ton on billet and bloom crops. As much as \$17 has been paid for short shoveling turnings, which are in demand in connection with blast furnace resumption. Compressed sheets are rated higher in sympathy with heavy melting grade. Pittsburgh mills as a rule are balking at paying the prices asked, but are not successful in weakening dealers' ideas since outside districts are paying the prices.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel.....	\$19.50 to \$20.00
No. 1 cast, cupola size.....	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; Franklin and Williamsport, Pa.....	21.50 to 22.00
Compressed sheet steel.....	17.00 to 17.50
Bundled sheet sides and ends.....	16.00 to 16.50
Railroad knuckles and couplers.....	22.50 to 23.00
Railroad coil and leaf springs.....	22.50 to 23.00
Low phosphorus standard bloom and billet ends.....	24.00 to 25.00
Low phosphorus, plates and other grades.....	22.00 to 23.00
Railroad malleable.....	17.00 to 17.50
Iron car axles.....	27.00 to 28.00
Locomotive axles, steel.....	25.00 to 26.00
Steel car axles.....	21.50 to 22.00
Cast iron wheels.....	22.50 to 23.00
Rolled steel wheels.....	22.50 to 23.00
Machine shop turnings.....	14.50 to 15.00
Heavy steel axle turnings.....	17.00 to 17.50
Short shoveling turnings.....	16.50 to 17.00
Cast iron borings.....	17.00 to 17.50
Heavy breakable cast.....	19.00 to 19.50
Stove plate.....	16.00 to 16.50
Sheet bar crop ends.....	23.00 to 24.00
No. 1 railroad wrought.....	16.00 to 16.50

Detroit Scrap Market

DETROIT, Sept. 11.—The market has a firm tendency and the large producers have been able to secure equipment to maintain shipments to melting points in that these points are south or in the direction of the mines. Automobile cast has been very active—some few sales having been made as high as \$23.50.

The following prices are on a gross ton basis f.o.b. cars producers' yards:

Heavy melting steel.....	\$15.25 to \$15.75
Shoveling steel.....	14.50 to 15.50
No. 1 machinery cast.....	15.50 to 16.50
Cast borings.....	12.00 to 13.00
Automobile cast scrap.....	22.00 to 23.50
Stove plate.....	14.00 to 14.50

Chicago

Heavy Demand for Steel from Many Sources— Railroad Buying Active

CHICAGO, Sept. 12.—For one important local mill, inquiry during the past week was the heaviest in a year and a half. Demand is well distributed, covering practically all commodities and coming from all of the usual sources of business, except the farm implement industry. Agricultural equipment makers commenced to buy on a moderate scale some three months ago, but orders from them have grown more infrequent as steel prices have advanced. The railroads and the car builders are still the most conspicuous factors in the market. The latter are pressing the mills hard for deliveries against contracts because the carriers are anxious for deliveries against their car orders. With a heavy coal traffic thrust upon them as the grain movement is getting under way, the roads need cars badly. As much of their present equipment is in bad order and they are behind on repair work, they want their new cars, because new equipment will operate for a considerable period without requiring attention.

While the mills are still handicapped in making the desired deliveries to the car companies, the outlook for improvement in steel production is better. The Illinois Steel Co., for example, has been able to put on two more blast furnaces at Gary and one at South Chicago, giving it 12 active stacks out of 29 in the district. At the same time, it has increased its steel output from slightly over 50 per cent to 60 per cent of ingot capacity. The Inland Steel Co., however, remains on a 60 to 65 per cent basis. While coal deliveries have improved sufficiently to enable a steel producer to put in three blast furnaces, the supply of fuel is still uncertain because of car shortage, and one merchant stack, an Iroquois furnace, was forced to bank to-day.

Evidently the rapidity with which production is resumed depends entirely on transportation. The level of steel prices shows little change, with prompt material commanding premiums as heretofore. The Inland Steel Co. has allocated among its customers much of its fourth quarter tonnage and additional orders will have to be squeezed into present rolling schedules.

Pig Iron.—Prices of local pig iron remain unchanged, although production has been further curtailed. While the mines are again producing, a shortage of cars is interfering with coal movement. The seriousness of the transportation situation is indicated by the fact that an Iroquois furnace was forced to bank to-day. This reduces the number of active stacks represented by the leading Northern merchant to four, namely, one Iroquois, one Federal, one Mayville, and the Zenith furnace. Car scarcity is also impeding the shipment of iron, for the railroads will not give the furnaces gondola cars with sides exceeding 44 in. in height, as they are assigned exclusively to the movement of coal. Demand is largely for prompt iron, although some inquiries for both first and second quarter deliveries, regarded as in the nature of feelers, have been received. Additional sales of St. Louis iron have been made in this territory, one for 1000 tons of malleable for prompt shipment being placed with a Wisconsin melter and another for 200 tons of foundry for fourth quarter being closed with a Northern Illinois user. Southern iron is still difficult to obtain because of transportation conditions. Two Southern furnaces are quoting \$25 base, Birmingham, with a dollar differential for each point 50 per cent of added silicon, and another stack is quoting \$26. The Sloss-Sheffield Steel & Iron Co. entered the market last week at \$25 base, Birmingham, with a 50c. differential, but has since withdrawn. The Virginia Iron, Coal & Coke Co. is soliciting business for fourth and first quarters at \$32 base furnace, the freight to Chicago being \$6.18. Silvery has advanced to a minimum of \$41.50, Jackson furnace, for 8 per cent. A sale of two cars of 7 per cent on the new basis has been made in Chicago. Low phosphorous pig iron is scarce and both copper free and copper bearing are commanding about the same prices. A sale of 300 tons of copper

bearing in Chicago and another of 100 tons of copper free in Milwaukee were both closed at the equivalent of approximately \$38 Valley furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	\$36.15
Northern coke, No. 1, sil. 2.25 to 2.75	33.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25.....	32.00
Northern high phos.....	32.00
Southern No. 2.....	\$31.00 to 32.00
Malleable, not over 2.25 sil.....	32.00
Basic	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free.....	38.00
Silvery, sil. 8 per cent.....	46.25

Ferroalloys.—A carload of spiegeleisen for local shipment has been sold at \$50, delivered. Ferromanganese for October shipment is being offered at \$67.50, seaboard, but prompt material is difficult to obtain. Prices on 50 per cent ferrosilicon have advanced to \$65, delivered, for both prompt and future shipment.

We quote 78 to 82 per cent ferromanganese, future, \$75.06; prompt, \$82.56, delivered; 50 per cent ferrosilicon, \$55 delivered on contract and \$65 prompt delivery; spiegel-eisen, 18 to 22 per cent, \$50, delivered.

Plates.—Orders and inquiries for railroad cars and oil storage tanks are few, but demand on the mills for plates is still heavy. Plates, as well as shapes and bars, continue to be bought by the railroads for car repair works. The quotation on tank plates for indefinite shipment remains 2.05c., Chicago, while the minimum on material for specific delivery is 2.30c., Chicago. As high as 2.25c., Pittsburgh, is being paid for shipment within a few weeks. The Inland Steel Co. has allocated much of its fourth quarter tonnage among customers, but can still offer November shipments.

The mill quotation is 2.05c. to 2.59c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Detroit has placed 800 tons with the United States Cast Iron Pipe & Foundry Co. and the same maker is low bidder on 188 tons for Milwaukee. Marshalltown, Iowa, took tenders yesterday on 140 tons and Chicago will receive bids on 200 feet of 12-in. and 1000 feet of 8-in. class B pipe Sept. 13.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$50.70 to \$52.20; 6-in. and above, \$46.70 to \$48.20; class A and gas pipe, \$3 extra.

Bars.—Demand for mild steel bars is heavy from all sources except the farm implement industry. The minimum price for indefinite shipment remains 1.95c., Chicago, while the best quotation on material for specific delivery is 2.10c., Chicago. A mill able to make prompt shipment is selling at from 2.50c. to 2.60c., Chicago. Sales by Eastern mills have been made at 2.25c., Pittsburgh. Demand for bar iron is decreasing, but prices remain firm at 2.25c. to 2.50c., Chicago. Rail steel buying is improving, with business coming largely from manufacturers, notably bedstead makers. Bar equipment manufacturers also are buying after a long absence from the market. Mills here are quoting 2c. to 2.10c., Chicago Heights, while the Moline mill has advanced to 2c. f.o.b. plant or slightly over 2.15c., delivered Chicago.

Mill prices are: Mild steel bars, 1.95c. to 2.50c., Chicago; common bar iron, 2.25c. to 2.50c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.90c.; bands, 3.55c.

Rails and Track Supplies.—The placing of rail business for 1923 delivery still awaits the naming of a price. Inquiry for spikes, bolts, angle bars and tie plates is heavy and orders are in good volume, one mill having booked an aggregate of 50,000 kegs of spikes and bolts.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 2c. to 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 2.75c. to 3c., mill; track bolts with square nuts, 3.75c. to 4c., mill; tie plates, steel and iron, 2.15c. to 2.25c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts 4.50c. base.

Wire Products.—Buyers continue to press business on the mills and the prospects for a heavy fall trade

are good. Orders from the South are particularly liberal and while there is some apprehension concerning the Western and Northern agricultural regions because of the low level of grain prices, it is pointed out that the crops are very large and the returns to the farmer will be sizable though the unit prices per bushel are low. Mill operations have not yet improved, but betterment is in sight. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 683.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright black wire, \$3.20 per 100 lb.; common wire nails, \$3.35 per 100 lb.; cement coated nails, \$2.75 per keg.

Bolts and Nuts.—Specifications against contracts closed at the old discounts are heavy. Business at the new discounts is rather light, but buyers are expected to close contracts soon for their fourth quarter requirements. Ruling prices are those on page 683 except that the basing point is Chicago.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to $\frac{3}{4}$ x 4 in., 50 per cent off; larger sizes, 45 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, \$2.75 off; blank nuts, \$2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off; quantity extras are unchanged.

Sheets.—The Inland Steel Co. has allocated practically all the fourth quarter tonnage it cares to book at this time. Customers took all the tonnage allocated to them and in most cases wanted more. Demand continues active with inquiries coming from all sections of the country and from abroad.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.60c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Reinforcing Bars.—A surprising number of new jobs, many of them large ones, are being placed notwithstanding the caution of sellers. Deliveries from the mills are still very slow, but improvement is looked for with the betterment in the fuel situation. In the meantime, however, dealers are carefully watching their warehouse stocks. Recent awards include:

Durant Motors Co., plant, Flint, Mich., 700 tons, to Paul J. Calman Co.

Reynolds Wire Co., plant, Dixon, Ill., 200 tons, to Paul J. Calman Co.

Illinois Improvement Co., Thirty-ninth Street sewer, Chicago, 375 tons, to Concrete Steel Co.

Kentucky highway work, 300 tons, to Corrugated Bar Co. Bridge, Constantine, Mich., 100 tons, to Corrugated Bar Co.

High school, Wichita, Kan., 400 tons, to Concrete Engineering Co.

Filtration plant, Oklahoma City, Okla., 200 tons, to Concrete Steel Co.

Bridges, northern Minnesota, 250 tons, to Corrugated Bar Co.

Pending business includes:

Chicago Trust Co. Building, Chicago, 400 tons.

Pine Grove Apartment Building, Chicago, 300 tons.

South Side High School, St. Louis, 550 tons.

Public Service Co. of northern Illinois, power station, Waukegan, Ill., 100 tons.

Structural Material.—A considerable number of fabricating awards have been reported during the past week, some of them covering large tonnages. Shops are crowded with work, but continue to quote on new business. Demand for plain material is heavy with 2.05c., Chicago, the quotation on steel for indefinite delivery and 2.25c., Chicago, the minimum price for specific shipment. Eastern mills are taking business for prompt shipment at as high as 2.15c., Pittsburgh.

The mill quotation on plain material is 2.05c. to 2.49c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Warehouse Prices.—Local jobbers have advanced bolts and nuts in keeping with the advances of manufacturers. New discounts are to be found under bolts and nuts. Small rivets have also been advanced, the discount being 55.

Old Material.—The market continues to advance in price in all departments. A feature of the week's business was the purchase of open-hearth grades by two of the leading steel mills. Buying of iron mill grades

is not so brisk as a week ago, and variations in consumer demand for other grades are also to be noted, but in the aggregate the available supply of scrap is far short of demand. Recent advances have caused some scrap to be released by country dealers, but this has not been in sufficient volume to weaken the market at a time when railroad offerings are almost nil. The Santa Fe, the Soo Line and the Chicago Great Western are advertising about 300 tons each.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$22.00 to \$22.50
Cast iron car wheels	23.50 to 24.00
Relaying rails	25.00 to 30.00
Roller or forged steel car wheels	22.50 to 23.00
Rails for rolling	19.50 to 20.00
Steel rails, less than 3 ft.	21.50 to 22.00
Heavy melting steel	18.50 to 19.00
Frogs, switches and guards cut apart	18.50 to 19.00
Shoveling steel	18.25 to 18.75
Drop forge flashings	12.50 to 13.00
Hydraulic compressed sheet	14.25 to 14.75

Per Net Ton	
Iron angles and splice bars	22.00 to 22.50
Steel angle bars	18.50 to 19.00
Iron arch bars and transoms	22.50 to 23.00
Iron car axles	24.50 to 25.00
Steel car axles	19.50 to 20.00
No. 1 busheling	15.50 to 16.00
No. 2 busheling	10.50 to 11.00
Cut forge	17.00 to 17.50
Pipes and flues	13.00 to 13.50
No. 1 railroad wrought	18.00 to 18.50
No. 2 railroad wrought	17.00 to 17.50
Steel knuckles and couplers	19.50 to 20.00
Coil springs	21.00 to 21.50
No. 1 machinery cast	22.00 to 22.50
No. 1 railroad cast	19.75 to 20.25
Low phosph. punchings	17.00 to 17.50
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	10.50 to 11.00
Cast borings	13.00 to 13.50
Stove plate	17.50 to 18.00
Grate bars	17.50 to 18.00
Brake shoes	17.50 to 18.00
Railroad malleable	21.00 to 21.50
Agricultural malleable	21.00 to 21.50

Little Change in Refractories

PITTSBURGH, Sept. 11.—The situation in refractories has undergone little change since last reports other than that with the upward slant of iron and steel plant operations, incident to the settlement of the coal strike, specifications by that industry are heavier than they had been recently. Strictly new business for blast furnace and steel works use, if by-product plant requirements are excluded, is not especially heavy, since orders for brick for iron making and steel melting units were pretty heavy prior to the advances made Aug. 23, and most current shipments are against those orders. The largest new projects are the new open-hearth furnace plants to be built by the Wisconsin Steel Co., South Chicago, and the Otis Steel Co., Cleveland, and the by-product plants at Clairton, Pa., and Weirton, W. Va. Because costs have been increased by the coal strike settlement and the wage increase made to other kinds of brick plant labor, the lately established prices are well observed on new business. The leading maker of silica brick in the Birmingham, Ala., district has announced a price of \$48 per 1000. A further advance of \$5 per 1000 has just been announced in the price of chrome brick, the new quotation being \$45 per 1000.

We quote per 1000, f.o.b. works:

Fire clay	High Duty	Moderate Duty
Pennsylvania	\$40.00 to \$43.00	\$36.00 to \$40.00
Ohio	40.00 to 43.00	36.00 to 40.00
Kentucky	40.00 to 43.00	35.00 to 39.00
Illinois	40.00 to 42.00	37.00 to 39.00
Missouri	40.00 to 42.00	35.00 to 39.00
Ground fire clay, per net ton	7.00 to 8.00	
Silica brick:		
Pennsylvania	45.00	
Chicago	53.00	
Birmingham	48.00	
Ground silica clay, per net ton	9.00	
Magnesite brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	60.00	
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	32.00	
Chrome brick:		
Standard size, per net ton	50.00	

New York

Much Uncertainty as to Embargoes—Foreign Iron Prices Lower

NEW YORK, Sept. 12.—Embargoes declared by nearly all Eastern railroads against almost all kinds of freight except foodstuffs and anthracite, have caused much apprehension among iron and steel manufacturers, and opinions vary as to what the effect will be. While it is hoped that it will not be necessary to continue the embargoes for a long time, there is great uncertainty and developments will be awaited with keen interest.

Pig Iron.—There is marked scarcity of domestic iron, but on the other hand, makers are not apparently very anxious to place orders. One broker who has a fair tonnage of iron for sale circularized his trade extensively and met little response. Prices of the domestic iron are on a basis of \$32, Eastern furnace, for No. 2 plain, that price being made by a steel company, while other sellers ask \$34. One broker who was unable to obtain a few hundred tons of domestic iron for prompt delivery paid \$36, Boston, for foreign iron. The principal sales of the week were foreign iron, including 8000 to 10,000 tons by one firm and about 5000 tons by another. Reports as to prices on Scotch and Continental iron vary greatly. One importer has disposed of 2000 to 3000 tons at about \$22.50, c.i.f. New York, for iron equivalent to No. 2X, but sales of Scotch are being made at from \$30 to \$32, and French, Belgian and other Continental irons analyzing 2.50 to 3 per cent silicon at \$26.50 to \$28, c.i.f. New York. The Virginia Iron, Coal & Coke Co. has announced that it will blow in a furnace in about 10 days and will sell on a basis of \$32 for No. 2 plain for delivery the last quarter of this year and first quarter of 1923. So far no sales have been reported.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	\$36.27 to \$38.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	35.27 to 36.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	34.27 to 36.27
Buffalo, sil. 1.75 to 2.25	37.91 to 38.91
No. 2 Virginia, sil. 1.75 to 2.25	No. sales

Ferroalloys.—An active demand for British ferromanganese continues and sales are reported of 3000 to 5000 tons in the last week at \$67.50, seaboard. One seller has sold all the October shipment available and some of his November allotment. Very little spot alloy is offered, but two carloads are noted at a considerable advance above the prevailing quotation for forward delivery. The spiegeleisen market is only moderately active. Both domestic and foreign alloy are available at \$38 to \$39, seaboard or furnace, and sales of several lots of 50 to 100 tons each of British alloy for importation are noted. There is a fairly active demand for prompt and early delivery of 50 per cent ferrosilicon at a minimum of \$57.50 per ton, delivered. Some producers are quoting a minimum of \$65 per ton, delivered. Specifications on contract made some time ago at lower prices are good. No activity in the manganese ore market is noted, but importations in July were very heavy at 62,518 gross tons, the largest for any month this year. In this connection it is also of interest to note that Government statistics show that the importations of ferromanganese in July were 25,841 tons, also the largest for any month this year and for any month in several years. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	\$67.50
Ferromanganese, British, seaboard, per ton	\$67.50
Spiegeleisen, 17 to 19 per cent, furnace	\$38.00
Spiegeleisen, 20 per cent, furnace	\$38.00 to \$39.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	\$57.50 to \$65.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	\$38.00 to \$40.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovandium, per lb. of contained vanadium	\$3.00 to \$3.50
Ferrocobaltititanium, 15 to 18 per cent, in carloads, per net ton	\$200.00
Ores	
Manganese ore, foreign, per unit, seaboard	28c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	\$3.50 up
Chrome ore, basis 48 per cent Cr ₂ O ₃ , crude, per ton, Atlantic seaboard	\$15 to \$18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York	45c. to 50c.

Finished Iron and Steel.—Though there is a continued easing in the steel mill situation, the willingness of the mills to sell a little more freely has not brought out a corresponding interest among consumers. Whether consumers believe that the increase in the coal and coke supply will eventually bring about an easier price situation in steel, or whether they are loath to commit themselves on steel purchasers until their coal supply is well assured, does not appear clear, but it is conceded that some influence has checked the eagerness of consumers which was displayed when steel was less easy to get. There is quite a wide spread in the price which mills are quoting on plates, shapes and bars. On plates quotations have been made from 2.10c., Pittsburgh, to 2.50c., but very little business has been placed at the latter figure. A majority of the mills are asking 2.25c., Pittsburgh, but it is difficult to negotiate anything but small or very urgent business on that basis. Shapes and bars are somewhat easier than plates, and are to be had from 2c. to 2.25c., Pittsburgh. Wire products have been advanced by some makers to the basis of \$2.50 per 100 lb. for plain wire and \$2.75 per 100 lb. keg, base, for wire nails. There is a falling off in fabricated steel business which mills and fabricators are unable to account for, except that buying generally has been checked. Inquiry by railroads for rolling stock also appears to have become considerably smaller in volume. For construction work on the Queens Boulevard, Long Island, bids are being asked on 4000 tons of concrete reinforcing bars.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery, soft steel bars, structural shapes and steel plates, 2.19c. to 2.24c.; for delivery in a number of weeks, soft steel bars and plain structural material, 2.34c. to 2.59c.; steel plates, 2.44c. to 2.84c.; bar iron, 2.59c.

Cast-Iron Pipe.—Pipe makers are well filled with orders for the remainder of the year. Deliveries on the small sizes are still extended, from three to four months being about the best offered by one foundry in this territory. No new municipal tenders are reported. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$54.50; 4-in. and 5-in., \$59; 3-in., \$64.80, with \$4 additional for Class A and gas pipe.

Old Material.—Prices continue strong all along the line. The tendency generally is upward, with cast iron in greater demand than steel. Practically all mills are buying, the only obstacle to the movement of heavy tonnages being a disinclination on the part of dealers to sell large orders except on much advanced prices. Although \$18.50 per ton is reported as the best price done in Pittsburgh on heavy melting steel, offerings at as high as \$20.50 per ton without takers is reported. Shipments by barge to Buffalo are stated to have declined somewhat. No. 1 heavy melting steel is still quotable at \$11.50 to \$12, and railroad steel ranges from \$12.75 to \$13.25 per ton. Not only does the upward trend of prices seem to be continuing, but there are rumors of sales of various items at higher prices than those now prevailing.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	\$11.50 to \$12.00
Steel rails, short lengths, or equivalent	12.75 to 13.25
Rerolling rails	12.75 to 13.25
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	23.00 to 24.00
No. 1 railroad wrought	15.00 to 15.50
Wrought iron track	12.75 to 13.25
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	10.75 to 11.25
Machine-shop turnings	10.25 to 10.75
Mixed borings and turnings	10.25 to 10.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.75 to 11.25
Stove plate	12.00 to 12.50
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	13.00 to 13.50
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	\$18.50 to \$19.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	12.50 to 13.00

Coke.—The coke market continues slightly easier and much difficulty is experienced in getting high-grade fuel. Furnace coke is quoted at \$10.50 to \$12, Connells-

ville ovens, and foundry at \$13 to \$14.50, with by-product \$14, seaboard.

Warehouse Business.—Active business is reported by practically all warehouses here, those handling structural material stating that the demand is particularly good in this line. While prices are strong and the tendency undoubtedly upward, the consensus of opinion seems to be that in the main prices have about reached their limit. A slight decline in the demand for black and galvanized sheets is noted. Brass and copper warehouses report good business, but no change in prices. Wrought iron and steel pipe dealers state that there has been a considerable improvement in business during the past few weeks and a distinct shortage of small sizes in both the iron and steel pipe is being felt. We quote prices on page 712.

High-Speed Steel.—The market is quiet and prices unchanged. Producers continue to quote 18 per cent tungsten high-speed steel at about 75c. per lb., with special brands of some companies ranging up to 90c. per lb.

Birmingham

Round Lot of Basic Sold at High Price— Slight Increase in Stocks

BIRMINGHAM, ALA., Sept. 12.

Pig Iron.—At the close of last week, the Birmingham iron market base was a spread from \$25 to \$27.50 with business done at both prices. The chief business done at \$27.50 was 10,000 tons of basic for delivery from October to January, and is said to have been taken by a Kentucky steel maker. Other sales at this base were car load and up to 100-ton lots for prompt delivery. For immediate delivery, any price asked was accepted by several stranded consumers. On the other hand, the principal foundry maker did not advance above \$25, Birmingham base, and is understood to have sold several thousand tons during the week in lots as high as 500 tons. St. Louis is credited with having taken 1000 tons of Birmingham iron at \$25 base. The leading steel interest, which does not consider itself a regular participant in the foundry iron trade, is known not to be holding iron at higher than \$25, and it is presumed that a large tonnage might be placed at \$24. The solid part of the market at the close of the week was at \$25 base, and in this part is the largest remaining unsold tonnage. If the Eastern markets steady down this week, the Birmingham market should be back to a base of \$25 maximum. Most makers wish the advance to stop. The surprise of the week was the showing of stocks on yards. On a production of 204,000 tons, only 35,000 tons was added to the low record of Aug. 1. Stocks on Alabama furnace yards Aug. 1 and Sept. 1 were as follows: foundry, 25,000 and 58,000 tons; machine cast, 1000 and 4800; warrants, 2000 and 1700; basic, 8500 and 7100; totals, 36,400 and 72,000 tons. The extreme low of basic indicates the heavy operations in finishing mills. The largest individual holdings were 21,000 tons.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$25.00 to \$27.50
Basic	24.00 to 27.50
Charcoal, warm blast.....	33.00 to 34.00

Finishing Mills.—Except for slowing down to 5000 tons of rails a week in the Ensley mill on account of the car situation, the Tennessee company continues 100 per cent operations with double turn in Bessemer, Fairfield and Ensley mills. The plant of the Chickasaw Shipbuilding & Car Co. has begun turning out 25 new steel cars together with numbers of repaired ones daily. This quota of new cars is the capacity for which the plant was planned. The Connors Steel Co. is operating both Woodlawn mills and shipping cotton ties on a brisk demand. A small shipment of hoops was made to China. The Gulf States Steel Co. and the American Steel & Wire Co. operate finishing mills at or near capacity under a very active demand.

Cast Iron Pipe.—The pipe markets are strong, but new business is not so great owing to unsteadiness of iron prices and poor delivery of pipe. The pressure pipe base remains at \$40 and the sanitary base at \$60.

Coal and Coke.—The coal market has eased up since withdrawal of the Western demand. Steam coal maximum is at \$3. Coke is very strong at \$8 and \$10. The Sloss-Sheffield Steel & Iron Co. reduced its by-product coke pile by 35,000 tons during the month.

Old Material.—The scrap market has shown much more life, with advancing prices and heavy movements from yards at these prices. The whole list has been revised.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	\$15.50 to \$16.00
No. 1 steel	14.50 to 15.00
No. 1 cast	17.00 to 19.00
Car wheels	17.00 to 19.00
Tramcar wheels	16.00 to 18.00
Stove plate	15.00 to 16.00
Cast iron borings.....	8.00 to 9.00
Machine shop turnings.....	8.00 to 9.00

Boston

Sales of Foreign Pig Iron Continue in Lots Not Exceeding 300 Tons

BOSTON, Sept. 12.—A good business in foreign pig iron in lots not exceeding 300 tons is reported for the past week. A reliable estimate of aggregate sales cannot be given due to the fact that some lots of iron represented resales through brokers. Scotch continues the most active foreign iron with sales covering September, October, November and December sailings. Continental irons are more attractive to buyers than heretofore because of their relative cheapness. The demand for English iron is much less than either Scotch or Continental. No. 3 Scotch in this market is \$30 to \$33 c.i.f. local dock, English \$27 to \$29, and Continental \$26.50 to \$31, depending on analysis. A limited tonnage of spot Scotch sold at \$35 on cars dock. It now develops a Massachusetts textile machinery maker bought 2000 tons Continental, silicon 2.50 to 3.00, at \$26.50, instead of 1000 tons previously reported. In domestic irons, activity centers in Alabama. A small tonnage sold ex-dock Providence, R. I., at \$35 base, and on cars at furnace at \$28 base. Due to the condition of railroad equipment, car loadings are smaller. For instance, cars heretofore loaded with 60 tons are now loaded with 30 tons. This practice places an additional cost burden on the New England foundry.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices \$3.65 freight from eastern Pennsylvania. \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75.....	\$38.15 to \$39.15
East. Penn., sil. 1.75 to 2.25.....	37.65 to 38.65
Buffalo, sil. 2.25 to 2.75.....	39.41 to 41.41
Buffalo, sil. 1.75 to 2.25.....	38.91 to 40.91
Alabama, sil. 2.25 to 2.75.....	35.10 to 38.10
Alabama, sil. 1.75 to 2.25.....	34.60 to 37.60

Warehouse Business.—The recent advance in iron and steel has not checked business, which holds to the August rate of activity. Warehouse quotations in structural steel take a wider range than heretofore, holders of small stocks quoting as high as \$4.50 a ton base, compared with \$3.25, the low point of the market. Stocks of small rounds, flats and bands continue broken. Bolts and nuts have gone up 10 per cent, but no change in washer prices is noted. Cut and hard steel nails have advanced 15c. a keg, the former now being quoted at \$4.05 per keg base, and the latter at \$8 base. Small rivets are 50 and 10 per cent discount, contrasted with 60 per cent heretofore. The call for large rivets is only fair at best. Jobbers anticipate an advance in wood screws shortly. Coach and lag screws have advanced 10 per cent.

Jobbers quote: Soft steel bars, \$3.25 per 100 lb. base; flats, \$3.85; concrete bars, \$3.25; structural steel, \$3.25 to \$3.50; tire steel, \$4.50 to \$4.85; open-hearth spring steel, \$5 to \$6.50; crucible spring steel, \$12; steel bands, \$4.25; hoop steel, \$4.75; cold rolled steel, \$4 to \$4.50; refined iron, \$3.25; best refined iron, \$4.50; Wayne iron, \$5.50; Norway iron, \$6 to \$6.50; plates, \$3.35 to \$3.55; No. 10 blue annealed sheets, \$4.15 per 100 lb. base; No. 28 black sheets, \$5.40; No. 28 galvanized sheets, \$6.40.

Coke.—New England by-product foundry coke producers are making freer deliveries on contracts than heretofore, due to their better position as to coal supplies. Foundries therefore show less interest in coke made outside this territory. Definite arrangements have been made for further shipments of Alabama by-product coke into New England. Most of it will be unloaded at Providence, R. I., due to the risk of demurrage at Boston. At present there is a large fleet of foreign steamers in Boston harbor with coal under heavy demurrage. Alabama coke is \$19 delivered and English coke continues at \$15 to \$16 on local dock. More of such cokes are being purchased by public utilities, etc., than by New England foundries. Connellsville coke is offered at \$14.50 to \$14.75 ovens with few takers.

Old Material.—Renewed activity in old materials is noted with a further strengthening in prices. The American Steel & Wire Co., Worcester, Mass., has purchased heavy melting steel at \$14.50 a ton delivered, while sales against Pennsylvania mill contracts at \$12 to \$13 on cars shipping point are reported. A Rhode Island concern is in the market for railroad malleable at \$15 a ton delivered. Sales of wrought iron at \$18 delivered Pennsylvania, or about \$13 on cars here, figure in the past week's transactions. The demand for mixed borings and turnings is brisk and the market is easily 50c. a ton higher. Short shoveling machine shop turnings easily command \$10.25 while bush material has sold at around \$9.25 and higher. Bundled skeleton suitable for steel mills sold at \$9 to \$9.50, while selected forged scrap changed hands at \$10 and \$10.50. The Sullivan Machinery Co. is in the market for 100 tons of No. 1 cotton mill machinery cast, and the Saco-Lowell Shops for 200 tons. Such material as well as general run of machinery cast is in limited supply. Foundries have absorbed stocks in small yards about as fast as accumulated. A sale of No. 2 machinery cast, the first noted in some time, at \$17 delivered, is reported.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$20.00 to \$21.50
No. 2 machinery cast.....	18.00 to 19.00
Stove plate.....	15.00 to 16.00
Railroad malleable.....	16.50 to 17.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$12.00 to \$13.00
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	12.50 to 13.00
Wrought pipe (1 in. in diameter, over 2 ft. long).....	10.00 to 10.50
Machine shop turnings.....	9.25 to 10.25
Cast iron borings, rolling mill.....	11.00 to 11.50
Cast iron borings, chemical.....	13.50 to 14.00
Blast furnace borings and turnings.....	9.50 to 10.00
Forged scrap.....	10.00 to 10.50
Bundled skeleton.....	9.00 to 9.50
Street car axles.....	18.00 to 20.00
Street car wheels.....	15.00 to 15.50
Re-rolling rails.....	12.50 to 13.00
Shafting.....	18.00 to 18.50

Cincinnati

Little Pig Iron for Prompt Shipment—Virginia Furnace Will Resume

CINCINNATI, Sept. 11.—There was little activity in the local pig iron market during the past week, the reason apparently being the lack of iron available for prompt shipment. Melters are not contracting ahead to any extent, the majority of the orders booked being carload lots for immediate shipment. The railroad situation is handicapping Southern furnaces greatly, and while a few carloads came through last week, most third quarter shipments are still en route. Receipt of this iron will mean that much less to be supplied during fourth quarter, but stocks on foundry yards have been depleted to such an extent that it is expected that melters will be willing to take in all iron now on contract, with enough additional tonnage to build up a stock for emergency purposes. Prices, while ruling at the same level as last week, are very firm, and with stocks so low and demand for fill-in purposes becoming more insistent, further advances are considered

likely. A large Southern interest opened its books for last quarter at \$25, Birmingham basis, but Southern iron has sold, for September shipment, at \$27 and \$30 is being quoted by several furnaces. Southern Ohio iron is available in limited quantities at \$32 to \$34, and silveries at \$41.50 for 8 per cent. No standard basic is available, but there are several small lots of off-iron being offered. Sales include 700 tons of southern Ohio basic to an Indiana steel company, 500 tons of Southern foundry to an Indiana melter, and 500 tons of malleable to an Indiana foundry. We also note a sale of 500 tons of ferromanganese to a Wheeling district consumer and 3000 tons of spiegel to a northern Ohio interest. Two inquiries for malleable, for 800 and 500 tons respectively, are current. Jisco silvery furnace will blow in about Sept. 15, and a furnace of the Virginia company, the first to operate in that State for over a year, will go in in about ten days. One Ashland stack of the American Rolling Mill Co. has gone out for relining.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$29.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	29.55
Ohio silvery (nominal), 8 per cent.....	43.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2).....	34.27
Basic Northern.....	32.27
Malleable.....	34.27

Plant Operations.—The American Rolling Mill Co.'s plants at Middletown and Zanesville continue to operate at capacity, with the Ashland works running at approximately 60 per cent. With a higher stage in the Ohio River following a "wave" the Whitaker-Glessner Co. at Portsmouth is assured of a coal supply sufficient to insure continuous operation for a few weeks. The Andrews Steel Co. and the Newport Rolling Mill Co. are maintaining their recent schedules of operations. It looks as though the steel plants in this district have passed through the worst of the coal shortage, and it is expected that current schedules will be maintained.

Finished Material.—The demand is insistent for prompt shipment materials, but more resistance is developing among purchasers to paying the higher prices asked. This is noticeably the case in the matter of plates, the demand for which has fallen off considerably. An independent company recently offered plates in the district, delivery in four to six weeks, at 2.25c. Pittsburgh, but the response by consumers has been disappointing. Bars, however, are in better demand, and 2.25c. has been done on several orders with delivery promises of six weeks. Sheets, too, are active. Most of the independent mills are not quoting further ahead than October, the prevailing prices being 2.75c. on blue annealed, 3.60c. on black, 4.50c. on galvanized and 4.95c. on automobile body sheets. The demand for wire products is improving, but shipments are poor owing to difficulty in securing box car equipment. No price changes in wire products have been made by mills in this district, though it is expected that further advances will soon be forthcoming. There is little activity in the structural field, three highway bridges being the only new inquiries out. In concrete reinforcing bars, a factory building in Cincinnati has been awarded, the Bourne-Fuller Co. receiving the order for approximately 250 tons.

Warehouse Business.—Local jobbers continue to do a heavy business, and are placing fair-sized orders to replenish their stocks. Concrete reinforcing bars and structural shapes are moving well, and nails and wire fence are being inquired for with more regularity. Roofing sheets are also in much improved demand. Prices, while strong, remain as last quoted, although there are prospects of a further upward movement of about \$2 a ton.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.55c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats, squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, \$2.85 per 100 lb.; common wire nails, \$3.05 per keg base.

Coke.—There is fair activity in the coke market, and we note a sale of 900 tons of by-product fuel at \$16, ovens, for immediate shipment. On contract coke by-product producers are naming \$11, ovens, for September shipment. Connellsville furnace is quoted at

\$10 to \$11, foundry at \$12.50 to \$14, Wise County furnace at \$11, foundry at \$13.50 to \$14, New River foundry at \$14 to \$15 and Pocahontas foundry at \$14.

Old Material.—The scrap market is strong and active. Several steel mills in this district are in the market for various tonnages, but with embargoes existing on a number of railroads, it is difficult to close deals. Cast grades are also more active, due to the shortage of pig iron, and some fair sized tonnages are being booked. Prices are very firm, with some grades bringing 50c. a ton over last week. We note an inquiry for 1000 tons of axles.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	\$9.50 to \$10.00
Iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up.	26.50 to 27.00
Rails for rolling	14.50 to 15.00
Heavy melting steel	15.00 to 15.50
Steel rails for melting	14.00 to 14.50
Car wheels	17.00 to 17.50
Per Net Ton	
No. 1 railroad wrought	13.50 to 14.00
Cast borings	10.50 to 11.00
Steel turnings	9.50 to 10.00
Railroad cast	16.00 to 16.50
No. 1 machinery	19.50 to 20.00
Burnt scrap	10.50 to 11.00
Iron axles	19.50 to 20.00
Locomotive tires (smooth inside)	12.50 to 13.00
Pipes and flues	7.50 to 8.00

Buffalo

Marked Scarcity of Basic Pig Iron—Moderate Sales of Foundry Grades

BUFFALO, Sept. 12.—Increased blast furnace operation which several producers expect to put in effect in September is more likely to be devoted to the production of basic iron than foundry iron and several furnaces predict basic iron will be much higher in this district this year. None is available now and if sales were made under present conditions, it is likely this product would bring \$35. Sales of foundry iron continue for small quantities and the aggregate business here does not exceed 2000 tons for the week. For No. 2 plain \$35 has been asked and received by the only one of the five producers who has foundry iron for sale. All sales are scattered and are for spot shipment; only a small quantity of last quarter iron has been sold here. Two furnaces are preparing to put stacks in blast this month. The falling off of inquiry is not a matter of serious concern to Buffalo producers at this time because those who normally have merchant iron for sale have sufficient business booked ahead to warrant their disinterest in further sales. Rogers, Brown & Co. are working on the 70,000 ton order placed last spring by the American Radiator Co. and two other furnaces have in excess of 10,000 tons each contracted for, not permitting any addition to new business.

We quote f.o.b. per gross ton Buffalo as follows, the higher prices being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	\$35.00 to \$36.00
No. 2X foundry, 2.25 to 2.75 sil.	34.00 to 35.00
No. 2 plain, 1.75 to 2.25 sil.	34.00 to 34.50
Basic	34.00
Malleable	36.00
Lake Superior charcoal	36.25

Finished Iron and Steel.—Return to the market on a wider variety of steel products by the local branch of a large independent is the only new development based on the easier fuel situation in this district. This interest is able to take bar business in a restricted way; acceptances subject to its ability to fit in tonnages on rolling schedules now existent. Acceptances on plates and structural shapes are freer. There is likelihood of an advance in tin plate prices and sheet demand with all sellers is strong. The labor shortage grows more serious and this is expected to be an obstacle to full acceptance of large tonnages regardless of any improvement in the coal situation. Demand for wire products is big and the leading wire maker is interested only in caring for its regular trade. No new structural projects have appeared and the general unsettled labor situation is expected to hold up a number of projects now in architects' offices. The maximum bar price is 2.25c. and bar tonnages named in inquiries range

from carload lots to 200 tons. A price of 1.95c. is now said to be the lowest quotation on bars.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.10c.; plates, 2.90c.; soft steel bars, 3c.; hoops, 4c.; bands, 3.80c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Heavy melting steel has advanced 25c. and the ruling quotation is now \$17 to \$17.50; with all mills buying, the situation amounts to a shortage of this product, or at least a shortage of large tonnages. Mills are not as rigid in their inspections as they were a few weeks ago when larger tonnages were available. A shortage of cars is holding up the movement of old material offered by the railroads and several roads are unable to ship material sold recently. A demand for other products has brought about new quotations which are listed below.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	\$17.00 to \$17.50
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	20.00 to 21.00
Machine shop turnings	13.00 to 14.00
Cast iron borings	15.00 to 16.00
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	19.50 to 20.50

St. Louis

Pig Iron Strong—Good Demand for Structural Steel

ST. LOUIS, Sept. 12.—The market for pig iron continues strong, with Northern iron unchanged at the previous week's advance of \$2 to \$32, f.o.b. Chicago, while Southern iron has advanced to \$25 to \$27, f.o.b. Birmingham. The only sales of consequence during the week were made by a Sheffield maker, one of 500 tons, one of 350 tons and one of 150 tons for shipment by barge to Metropolis, Ill., thence by rail, and these shipments have been coming through. Other rail shipments from the Birmingham district have met with considerable difficulties in their movement northward. The sales for the most part were in small lots, melters seeming to realize the difficulties in getting orders placed and then shipped. The Granite City maker sold additional tonnage of low silicon iron during the week. Thirty days ago, it had 40,000 tons of this grade of iron in its yards; at the close of the week, it had sold all but 18,000 tons, with the prospect of the yard being completely cleaned out of it shortly. This maker is now negotiating for the sale to an Ohio melter of 750 tons of foundry iron and 750 tons of malleable. The Granite City furnace has sold its current make of foundry iron for the next 30 days. A Michigan melter wants 1000 tons of foundry iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago and \$5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25..	\$32.16
Northern malleable, sil. 1.75 to 2.25..	32.16
Basic	32.16
Southern foundry, all rail, sil. 1.75 to 2.25	\$27.17 to 29.17

Finished Iron and Steel.—There continues to be a good demand for structural steel, and one of the local fabricators has recently booked more than 10,000 tons. The E. C. Gerhard Building Co. was the low bidder on the South Side High School, St. Louis, and the contract will be signed after approval by the Board of Education this week. Inquiries continue to come in from the purchasing agents of railroads. The Missouri Pacific has asked for prices on its 1923 requirements for rails, the tonnage not being specified. The Mobile & Ohio Railroad wants 900 kegs of track spikes; the Wabash 370 kegs of track bolts, the St. Louis Southwestern 500 kegs of track bolts and 300 kegs of track spikes, and the St. Louis & San Francisco, 600 tons of structural

steel. The agricultural implement manufacturers have been pushing the mills hard for material, and there was an inquiry for 300 tons of cut plow shapes. The stocks of steel are very scarce, and with the demand continuing it is felt by some men in the trade that it will not be long before the mills will be allocating material, as was done during the war. Warehouse prices have advanced.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.60c. per 100 lb.; boiler rivets, 3.70c.; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, \$3.50; and tapped, \$3.25 off list.

Coke.—The market for coke is even stronger than last week, due to the increasing demand and limited sources of supply. The Terre Haute and Indianapolis by-product producers are out of the market, and other territories are looking more and more to St. Louis for their supplies. There is one inquiry for 50 carloads of foundry coke from an Ohio user. The Granite City by-product foundry coke is selling at \$12 f.o.b. furnace, and domestic coke at \$10.50. Very little Southern coke is getting through because of the railroad congestion.

Old Material.—The market for old material shows added strength. Very little material is coming in, the first railroad list in two months coming from the Louisville & Nashville Railroad, being about 300 tons that had been loaded onto cars before the strikes. The mills here are in the market for considerable tonnage, especially for melting grades, but dealers are not eager to sell at present prices.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails.....	\$17.75 to \$18.75
Rails for rolling.....	19.00 to 19.50
Steel rails, less than 3 ft.....	17.50 to 18.00
Relaying rails, standard section.....	26.00 to 29.00
Cast iron car wheels.....	21.50 to 22.00
No. 1 heavy railroad melting steel.....	17.50 to 18.00
No. 1 heavy shoveling steel.....	16.50 to 17.00
Ordinary shoveling steel.....	16.50 to 17.00
Frogs, switches and guards cut apart.....	16.50 to 17.00
Per Net Ton	
Heavy axle and tire turnings.....	11.50 to 12.00
Steel angle bars.....	15.75 to 16.25
Iron car axles.....	25.50 to 26.00
Steel car axles.....	19.00 to 19.50
Wrought iron bars and transoms.....	20.50 to 21.00
No. 1 railroad wrought.....	15.25 to 15.75
No. 2 railroad wrought.....	14.50 to 15.00
Railroad springs.....	18.50 to 19.00
Steel couplers and knuckles.....	18.50 to 19.00
Cast iron borings.....	11.00 to 11.50
No. 1 busheling.....	13.00 to 13.50
No. 1 railroad cast.....	19.50 to 20.00
Railroad malleable.....	15.50 to 16.00
Machine shop turnings.....	9.50 to 10.00

Cleveland

Four Blast Furnaces Added to Active List— Easier Conditions Expected

CLEVELAND, Sept. 12.—The fuel situation is growing somewhat easier and as the result three additional furnaces are being placed in blast in this territory. The Trumbull Steel Co., Warren, Ohio, resumed the operation of its blast furnace to-day, the Otis Steel Co. has re-lighted one Cleveland stack and will resume making iron to-morrow, and Pickands Mather & Co., Cleveland, blew in a Toledo stack Sept. 8. Both Toledo furnaces are now in blast. The one just started up has been shut down for a number of months. In all, four furnaces have been added to the active list in this territory since the fuel situation began to improve. However, the improvement applies only to furnaces using by-product coke. Furnaces using beehive coke are waiting for lower fuel costs, not being willing to start up on \$11 contract coke. Furnaces that use coking coal from West Virginia and Kentucky report that with bad transportation facilities and priority orders for lake coal their fuel shipments from these districts are not improving.

Owing to the increase in plant operations, due to the easing up of the fuel situation, steel for early shipment has become somewhat more plentiful. Various embargoes are in effect on a number of railroads and these are interfering with pig iron shipments from several furnaces. However, railroads are handling steel shipments fairly promptly, except to points south of the Ohio River. Owing to a scarcity of box cars, sheet mills are shipping their products in open top cars.

Pig Iron.—The blowing in of additional merchant furnaces is expected to result shortly in the easing up of the pig iron situation. One lake furnace that placed a stack in blast during the week is again booking orders for delivery over the remainder of the year. Another lake producer that has started up a furnace has no iron to offer from this stack during the remainder of the year, but will be able to make shipments on existing contracts. The market is dull but very firm. A Cleveland producer has again advanced prices \$1 per ton to \$36 for foundry grades and has taken a few small lot orders at that price. This producer has sold some foundry iron in small lots at \$35, Cleveland, for Pittsburgh district delivery, or equivalent to \$36.50, Valley. One lake furnace interest is quoting foundry iron at \$32 to \$33, depending on the location, and reports sales aggregating 2500 tons in lots of 500 tons and under at that price. One eastern Ohio consumer was able to buy foundry iron at \$31.50 furnace, but the freight rate brought it around to about \$33.50, Valley base. Southern Ohio iron is still being offered in this market at \$32 to \$33. Considerable pig iron inquiry is coming from far extended points, as far as Maine and Minnesota. Low phosphorus iron continues fairly active. A Valley interest during the week sold several lots aggregating 1200 tons at \$38. One Ohio silvery manufacturer has made a \$4 advance to \$41.50 for 8 per cent. This now seems to be the price commonly named by silvery producers.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a \$3.02 rate from Jackson and a \$6 rate from Birmingham:

Basic, Valley furnace, nominal.....	\$32.00
Northern No. 2 fdy., sil. 1.75 to 2.25.....	\$35.00 to 36.00
Southern fdy., sil. 1.75 to 2.25.....	31.00
Malleable.....	35.00
Ohio silvery, nom., sil. 8 per cent.....	44.52
Standard low phos., Valley furnace.....	38.00

Iron Ore.—The effect of the coal and railroad strikes on the iron and steel industry will be reflected in a falling off in iron ore shipments this month. The Pittsburgh Steamship Co. is laying up all of its barges this week, and some steamers will go out of commission. Some independent consumers have asked shippers to defer deliveries on contracts until next year. With coal moving in better volume, the car supply for ore is now becoming short, as many cars are sent back empty to the coal mines. Both ore docks and furnace yards generally are well filled with ore and available dock space is becoming short. The amount of ore on dock increased over 600,000 tons during August. The amount on lower lake docks Sept. 1 was 8,064,101 gross tons as compared with 9,285,708 tons on the same date a year ago. Receipts at Lake Erie ports during August amounted to \$6,721,735 tons and for the season till Sept. 1 18,671,619 tons. Shipments from these ports during the month were 4,204,611 tons and for the season until Sept. 1, 13,129,570 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$5.95; Old range non-Bessemer, 51½ per cent iron, \$5.20; Mesabi Bessemer, 55 per cent iron, \$5.70; Mesabi non-Bessemer, 51½ per cent iron, \$5.05.

Bolts, Nuts and Rivets.—Jobbers and implement manufacturers are placing orders freely for bolts and nuts and specifications on old contracts are fairly heavy. Prices are firm at the advance and while manufacturers are not eager to book orders for extended deliveries, some are taking fourth quarter contracts at the present prices. Rivet specifications on third quarter contracts placed at the old prices are heavy and small miscellaneous lot sales are reported at the higher prices now prevailing. While 65 per cent off list is being quoted on small rivets, the 65 and 5 per cent discount has not disappeared.

Semi-Finished Steel.—There is considerable inquiry for sheet bars, billets and slabs, for prompt shipment and fourth quarter, but the supply is very limited. We note the sale of about 1000 tons of billets by a local mill at \$40.

Finished Iron and Steel.—Two or three independent mills that had been out of the market but have increased operations are now taking orders for steel bars, plates and structural material and are making better delivery promises. Mills that can make shipments in 30 to 60 days are getting a fair volume of orders, but buying for more extended deliveries has fallen off. There is apparently a disposition among buyers to place orders for only what they need for early requirements, evidently expecting that with an increase in the supply of steel some of the premium prices will disappear and the market will settle down to around the present minimum prices. The market continues firm with little change in the price situation. Quotations of steel bars range from 1.90c. to 2.25c., but sellers do not appear able to get the maximum price except for prompt shipment. Plate quotations by independent mills range from 2.25c. to 2.50c. While the lower quotation is more common, some of the mills are taking a few small lot orders at the higher price. On structural material the minimum quotation is around 2c. On hoops and bands, 2.75c. now appears to be the minimum price. While hot-rolled strip steel is commonly quoted at 2.75c., the 2.60c. price has not disappeared. At least one independent mill has advanced its price on nails to 2.75c. and on plain wire to 2.50c. The higher steel prices evidently have checked building work in this city, as several contracts that have been pending have not been placed, and new inquiries are light. However, local fabricators are figuring on considerable new work in other districts.

Jobbers quote steel bars, 2.81c.; plates and structural shapes, 2.91c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.61c.; cold-rolled rounds, 3.60c.; flats, squares and hexagons, 4.10c.

Sheets.—The Ford Motor Co. has released a portion of the sheets that it held up recently when it announced that its plant would shut down Sept. 16. These sheets are shipped directly to the companies making car frames and other parts. The demand for sheets continues fair, although there has been some slowing down in orders from automobile manufacturers. The market is firm. Minimum quotations by independent mills are 3.50c. for black, 4.50c. for galvanized and 2.60c. for blue annealed.

Reinforcing Bars.—The demand for reinforcing bars continues active. An inquiry is pending for 3000 tons of mild steel bars for the Connors Creek sewer, Detroit, and as early shipment is desired, the order may be divided among several mills. Among new inquiries is one for 1100 tons for a filtration plant in Bay City, Mich., and another for 500 tons for the Tecumseh Storage Building, Toledo, Ohio. Hard steel bars are firm at 2c.

Coke.—Connellsville foundry coke has become more plentiful and the price has declined \$1.50 per ton to \$13. The supply is sufficient to meet the current demand, which is light.

Old Material.—With an increase in the consumption of steel making scrap, a scarcity due partly to the limited offering by the railroads and the difficulty in moving scrap because of transportation conditions, prices on many of the grades have further advanced 50c. to \$1 per ton. Locally the activity is almost wholly due to purchases by dealers to cover old orders for the McKinney Steel Co. Dealers have bid scrap prices up to a higher point than mills may be willing to pay and believe there will be further advances. As high as \$19.25 has been paid by a dealer for heavy melting steel delivered to a Cleveland consumer, but this price appears to be about 50c. a ton higher than the prevailing market price. The high price of pig iron has resulted in a further advance of various grades of cast

scrap. A sale of steel car wheels is reported at \$20.50 delivered, at the northern Ohio steel plant.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$17.75 to \$18.25
Steel rails under 3 ft.....	18.00 to 18.50
Steel rails for rolling.....	18.50 to 19.00
Iron rails.....	16.00 to 17.00
Iron car axles.....	21.00 to 22.00
Low phosphorous melting.....	18.00 to 18.25
Cast borings.....	13.50 to 14.00
Machine shop turnings.....	13.25 to 13.50
Mixed borings and short turnings.....	12.75 to 14.00
Compressed steel.....	16.00 to 16.25
Railroad wrought.....	16.00 to 17.00
Railroad malleable.....	18.00 to 18.50
Light bundled sheet stampings.....	12.00 to 12.50
Steel axle turnings.....	15.00 to 15.25
No. 1 cast.....	20.00 to 20.50
No. 1 busheling.....	13.00 to 13.25
Drop forge flashings over 10 in.....	12.25 to 12.50
Drop forge flashings under 10 in.....	13.25 to 13.50
Railroad grate bars.....	16.00 to 16.50
Stove plate.....	16.00 to 16.50
Pipes and flues.....	13.50 to 14.00

Philadelphia

Easier Situation in Iron and Steel Markets—

Pig Iron Lower

Increasing operations at western and eastern Pennsylvania steel plants and blast furnaces have brought about an easier situation in finished steel and pig iron within the past week. The Bethlehem Steel Co. has put four furnaces in blast, now having 10 active stacks. The Midvale Steel & Ordnance Co. put one furnace in blast at Johnstown, now having four active there, and blew in a stack at Coatesville to-day. The Coatesville plate mill, which has been operated at a very low rate for many months, will now increase output as rapidly as business will permit. Steel is being offered more freely for early delivery, but prices show no change downward, and there have been some belated advances. With its increase in active furnaces, the Bethlehem Steel Co. has again become a seller of foundry and basic pig iron and is offering contracts over the remainder of the year.

The price situation is decidedly mixed. Bars and shapes are offering by various mills at prices ranging from 2c. to 2.25c., Pittsburgh, while on plates there is a spread of \$8 a ton, 2.10c. being the minimum and 2.50c., Pittsburgh, the maximum. Tin plate is firm at \$4.75 and may be advanced; sheets are firm at 2.60c., 3.50c. and 4.50c. for blue annealed, black and galvanized, respectively, and may go higher, some mills already quoting 2.75c. on blue annealed. Bar iron has been advanced by Eastern makers from 2.10c. to 2.25c., Pittsburgh, for carload lots. Wire products have been advanced \$3 a ton by nearly all independent mills. Light rails have been sold freely since the reopening of the coal mines at 2.25c., Pittsburgh, an advance of \$5 a ton. In semi-finished steel there is marked strength, as high as \$50 having been received for forging billets and \$47.50 has been paid for wire rods.

Opening its books for fourth quarter, an Eastern pig iron producer has offered No. 2 plain at \$32, No. 2X at \$33 and No. 1X at \$34, f.o.b. furnace, these prices being lower than the emergency quotations which have prevailed in the past two weeks. Basic is offered at \$30, furnace.

Pig Iron.—The most interesting development of the week is the announcement of a leading Eastern producer of pig iron that it will take orders for delivery over the remainder of the year at \$32 for No. 2 plain, \$33 for No. 2X and \$34 for No. 1X, f.o.b. furnace. This producer has been out of the foundry iron market for some time due to the shortage of coal and coke. Two other merchant producers which are active sellers have made no change in their prices and are quoting \$34 for No. 2 plain, \$35 for No. 2X and \$37 for No. 1X. Another interesting development is the announcement that the Virginia Iron, Coal & Coke Co. will put a furnace in blast shortly and sales for fourth quarter are authorized at \$32 for No. 2 plain, \$33 for No. 2X, and \$34 for No. 1X, f.o.b. furnace, with a freight rate

of \$5.17 to Philadelphia. This will be the first blast furnace operation in Virginia since October, 1921. Except for some increases at steel plant blast furnaces there has been no addition to active furnaces. The Robesonian stack has been added to the idle list because of coke shortage. Current sales of foundry pig iron are largely foreign grades, which are now being sold at prices ranging from \$26 to \$28 for Continental; \$26 to \$30 for English, and \$31 to \$34 for Scotch, all f.o.b. cars, Philadelphia. The variation in price is due to differences in analysis. Receipts at this port are now fairly heavy, but most of the iron coming in has already been sold and is being unloaded from ship on cars and dispatched immediately. Including that arriving this week, upward of 30,000 tons will reach Atlantic ports within the next three weeks. One broker has contracted for iron for shipment as late as next December and has about 10,000 tons of Scotch iron and smaller quantities of English and Continental iron still unsold. The largest lot sold to any one foundry is 5000 tons. Some foundries which have used foreign iron experimentally have had very successful results and have entered orders for larger tonnages than were first bought. Pig iron inquiries for fourth quarter are coming into the market more freely, the tonnages asked for usually ranging from 500 to 1000 tons. There is no demand for basic iron, which is to be had from one furnace company at \$30, furnace, while another asks \$33, furnace. Malleable iron is available at \$33, furnace. Copper bearing low phosphorous iron is quoted at \$37 to \$38, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to \$1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$33.64 to \$35.64
East. Pa. No. 2X, 2.25 to 2.75.....	34.64 to 36.64
East. Pa. No. 1X.....	35.64 to 37.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	37.17
Virginia No. 2X, 2.25 to 2.75 sil.	38.17
Basic delivered eastern Pa.....	32.00 to 34.00
Gray forge	31.00 to 33.00
Malleable	35.00 to 36.00
Standard low phos. (f.o.b. furnace)...	38.00 to 40.00
Copper bearing low phos. (f.o.b. furnace)	37.00 to 38.00

Semi-Finished Steel.—One company is still quoting \$40 on open-hearth re-rolling billets and \$45 on forging billets, Pittsburgh, but sales have been made by other producers at higher prices, \$47.50 and \$50, Pittsburgh, having been paid for forging billets. It is doubtful whether wire rods can now be obtained for early delivery at \$45, which is the nominal quotation of some makers; sales have been made at \$47.50, Pittsburgh.

Light Rails.—Re-opening of the coal mines has brought a renewed demand for light rails, which one large independent producer is selling from stock at 2.25c., Pittsburgh. Another producer still quotes 2c., but this is for deferred delivery.

Plates.—The wide spread in plate prices is one of the anomalies of the present steel situation. The lowest quotation is 2.10c. and the highest 2.50c., Pittsburgh, a difference of \$8 a ton, and a peculiar thing is that business is being done at both levels, and also at 2.25c., Pittsburgh, which other mills are quoting. Three of the Eastern mills are quoting 2.50c. The volume of business is not large, but the mills have orders on their books ranging from a few weeks to two or three months' work. The Midvale Steel & Ordnance Co., which has been operating its Coatesville plate mill at low ebb for some months, is now willing to sell freely and will increase operations at Coatesville as rapidly as possible. A blast furnace there was blown in to-day. The Baldwin Locomotive Works will require about 1500 to 1800 tons of plates for 50 locomotives for the St. Louis & San Francisco Railroad.

Structural Material.—A Pittsburgh mill is offering shapes at 2c., Pittsburgh, but the sizes offered are mostly those from its 28-in. mill. Eastern mills are asking at least 2.25c., Pittsburgh, and one or two, which have little to sell, quote still higher. The largest job in the market is the addition to the Girard Trust Co. building, which will require about 1200 tons.

Bars.—Eastern makers of bar iron have advanced prices to 2.25c., Pittsburgh, for car-load lots and 2.50c.

for less than car-loads. Advancing prices of scrap are a factor in this advance. Steel bars are generally quoted at 2.25c., Pittsburgh, but one Pittsburgh mill is offering bars at 2c. A local firm has imported 500 tons of Belgian bars of small sizes, which are being offered at a price equivalent to 1.90c., Pittsburgh.

Sheets, Strip Steel and Tin Plate.—An Eastern maker of blue annealed sheets has advanced its price \$3 a ton to 2.75c., Pittsburgh. While other makers quote 2.60c., it is stated that a general advance by independents is probable. Black sheets are quoted at 3.50c. and galvanized at 4.50c., Pittsburgh, for early delivery and mills are not desirous of making fourth quarter contracts at this time. Cold rolled strip steel is firm at 4.25c. and hot rolled, except narrow bands, is quoted at 2.75c., Pittsburgh. Narrow bands are quoted at 3c. Tin plate is firm at \$4.75 per base box and although business is limited an advance is predicted.

Warehouse Business.—Local warehouses have advanced prices all along the line about \$2 a ton. Business continues in fair volume. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.10c.; round edge steel, iron finish, 1½ x ½ in., 3.10c.; round edge steel planished, 3.85c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.80c.; 3/16-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.60c.; squares and hexagons, cold-rolled steel, 4.10c.; steel hoops, No. 13 gage and lighter, 4.10c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.70c.; rails, 2.90c.; tool steel, 8.50c.; Norway iron, 5.50c.

Coke.—Odd lots of blast furnace coke are available at prices ranging from \$10 to \$11, Connellsville, and foundry coke is quoted at \$12 to \$13, Connellsville. Supplies of coke are a little more plentiful, but the price of furnace coke is still too high to encourage furnace operators to make contracts.

Old Material.—Within the past week there has been a sharp advance in practically all grades of scrap. The advance on steel scrap has not exceeded 50c. to \$1 a ton, but on some other grades there has been a rise of \$2 a ton. With the settlement of the coal strike there have been increased operations at nearly all steel mills, but the coke supply has not increased rapidly enough to give these mills enough pig iron, hence most of them are seeking scrap. The railroad strike has seriously interfered with the gathering of scrap by the railroads, upon which considerable dependence must be placed during the next few months if steel mills are not to face an actual shortage of melting steel. Scrap sold by the Pennsylvania Railroad from its September list brought high prices, \$21, Youngstown, for steel scrap and \$21.50 for railroad wrought being examples. A Cumberland, Md., mill has paid \$20 for heavy melting steel, this being the highest price steel scrap has reached in some time. Brokers are offering \$21, Youngstown, for steel scrap. Johnstown, Pa., has paid \$17.50 and \$18, delivered.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$16.00 to \$17.00
Scrap rails	16.00 to 17.00
Steel rails for rolling.....	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels.....	21.00 to 22.00
No. 1 railroad wrought.....	21.00 to 22.00
No. 1 yard wrought.....	18.50 to 19.00
No. 1 forge fire.....	15.50 to 16.00
Bundled sheets (for steel works)....	14.50 to 15.50
No. 1 busheling.....	13.50 to 14.50
No. 2 busheling.....	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use).....	13.50 to 14.00
Mixed borings and turnings (for blast furnace use)	13.50 to 14.00
Machine-shop turnings (for steel works use)	15.00 to 16.00
Machine-shop turnings (for rolling mill use)	15.00 to 16.00
Heavy axle turnings (or equivalent)	15.50 to 16.00
Cast borings (for steel works and rolling mills)	16.00 to 16.50
Cast borings (for chemical plants)...	17.50 to 18.00
No. 1 cast.....	21.00 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 20.00
Railroad grate bars.....	16.00 to 16.50
Stove plate (for steel plant use)....	16.00 to 16.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	15.00 to 16.00
Shafting	\$2.00 to 23.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.00c. to 2.50c.

Structural Material

Beams, channels, etc.....2.00c. to 2.25c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.90c. to 2.25c.

Refined iron bars, base, per lb.....2.45c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 3c.

Bands, base, per lb.....2.75c. to 3c.

Strips, base, per lb.....2.75c. to 3c.

Cotton ties, per bundle of 45 lb.....\$1.12

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.

Strips, base, per lb.....4.25c.

Wire Products

Nails, base, per keg.....\$2.60 to \$2.75

Bright plain wire, base, per 100 lb.....2.35 to 2.50

Annealed fence wire, base, per 100 lb.....2.35 to 2.50

Galvanized wire, base, per 100 lb.....2.85 to 3.00

Galvanized barbed, base, per 100 lb.....3.15 to 3.40

Galvanized staples, base, per keg.....3.15 to 3.40

Painted barbed wire, base, per 100 lb.....2.65 to 2.90

Polished staples, base, per keg.....2.65 to 2.90

Cement coated nails, base, per count keg.....2.10c. to 2.35c.

Woven fence, carloads (to jobbers).....70½ to 72 per cent off list

Woven fence, carloads (to retailers).....68 to 69½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60 and 10 per cent off list

Machine bolts, small, cut threads, 50, 10 and 10 per cent off list

Machine bolts, larger and longer.....50, 10 and 10 per cent off list

Carriage bolts, ¾ x 6 in.:

Smaller and shorter, rolled threads,

Cut threads.....50, 10 and 10 per cent off list

Longer and larger sizes.....50 and 10 per cent off list

Lag bolts.....60 and 10 per cent off list

Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list

Other style heads.....20 per cent extra

Machine bolts, c.p.c. and t. nuts, ¾ x 4 in.:

Smaller and shorter.....45 and 10 per cent off list

Larger and longer sizes.....45 and 10 per cent off list

Hot pressed square or hex. blank nuts.....\$3.75 off list

Hot pressed nuts, tapped.....3.75 off list

C.p.c. and t. sq. or hex. nuts, blank.....3.75 off list

C.p.c. and t. sq. or hex. nuts, tapped.....3.75 off list

Semi-finished hex. nuts:

¾ in. and smaller, U. S. S.....80 per cent off list

¾ in. and larger, U. S. S.....75 per cent off list

Small sizes, S. A. E.....80 and 10 per cent off list

S. A. E., ¾ in. and larger.....75 and 10 per cent off list

Stove bolts in packages.....80 and 5 per cent off list

Stove bolts in bulk.....80, 5 and 2½ per cent off list

Tire bolts.....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws,

Milled set screws.....75 and 10 per cent off list

Upset cap screws.....75 per cent off list

Upset set screws.....80 per cent off list

Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....\$3.00

Large boiler rivets, base, per 100 lb.....3.10

Small rivets.....65 to 65 and 5 per cent off list

Track Equipment

Spikes, 9 16 in. and larger, base, per 100 lb.....\$2.75

Spikes, ½ in. and smaller, base, per 100 lb.....3.25

Spikes, boat and barge, base, per 100 lb.....3.25

Track bolts, base, per 100 lb.....\$3.75 to 4.50

Tie plates, per 100 lb.....2.25

Angle bars, base, per 100 lb.....2.40

Welded Pipe

Butt Weld

Inches Steel Black Galv. 1 16 to ¾.....51½ 31½ 1 16 to ¾.....57 31½ 1 16 to ¾.....62 31½ 1 16 to ¾.....66 31½ 1 16 to ¾.....68 31½

Inches Iron Black Galv. 1 16 to ¾.....26 1 16 to ¾.....27½ 1 16 to ¾.....31½ 1 16 to ¾.....37½ 1 16 to ¾.....39½ 1 16 to ¾.....42½

Lap Weld

2.....61 49½ 2.....34½ 20½

2½ to 6.....65 53½ 2½ to 6.....37½ 24½

7 to 8.....62 49½ 7 to 12.....35½ 22½

9 to 12.....61 48½

Butt Weld, extra strong, plain ends

1 16 to ¾.....47½ 31 1 16 to ¾.....+ 42½

1 16 to ¾.....53 36½ 1 16 to ¾.....30½ 18½

1 16 to ¾.....59 48½ 1 16 to ¾.....37½ 23½

1 16 to ¾.....64 53½ 1 16 to ¾.....39½ 25½

1 to 1 16.....66 55½

2 to 3.....67 56½

Lap Weld extra strong, plain ends

2.....59 48½ 2.....35½ 22½

2½ to 4.....63 52½ 2½ to 4.....38½ 26½

4½ to 6.....62 51½ 4½ to 6.....37½ 25½

7 to 8.....58 45½ 7 to 8.....30½ 18½

9 to 12.....52 39½ 9 to 12.....25½ 13½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel 1 16 in.....23½ 1 16 in.....+ 2

2 to 2 16 in.....38 2 to 2 16 in.....8

2 16 to 3 in.....49 2 16 to 3 in.....18

3 16 to 3 in.....54 3 16 to 3 in.....23

3 16 to 4 16 in.....25 3 16 to 4 16 in.....25

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.....57 2 16 and 2 16 in.....40

1 16 and 1 16 in.....49 3 in.....44

1 16 in.....33 3 16 to 4 in.....49

2 and 2 16 in.....36 4 16 in. and 5 in.....41

Hot Rolled

3 in.....46 3 16 to 4 in.....51

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 85 per cent off list. Carbon 0.30 to 0.40, base, 83 per cent off list. Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft. 2-in. O.D. 12 gage.....13 2 16 in. O.D. 10 gage.....17½

2-in. O.D. 11 gage.....14 3-in. O.D. 7 gage.....33

2-in. O.D. 10 gage.....15 1 16 in. O.D. 9 gage.....13

2 16 in. O.D. 12 gage.....15 5 16 in. O.D. 9 gage.....51

2 16 in. O.D. 11 gage.....16 5 16 in. O.D. 9 gage.....53

Tin Plate

Standard cokes, per base box.....\$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating.....\$9.30 25-lb. coating I. C.....\$14.25

8-lb. coating I. C.....9.60 30-lb. coating I. C.....15.25

15-lb. coating I. C.....11.80 35-lb. coating I. C.....16.25

20-lb. coating I. C.....13.00 40-lb. coating I. C.....17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c. to 2.75c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c. to 3.75c.

Galvanized

No. 28 (base), per lb.....4.35c. to 4.75c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c. to 3.50c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.....\$0.325	Buffalo.....\$0.265	St. Louis.....\$0.43	Pacific Coast.....\$1.50
Philadelphia, export.....0.235	Cleveland.....0.215	Kansas City.....0.735	Pac. Coast, ship plates 1.20
Baltimore, domestic.....0.315	Cleveland, Youngstown.....0.19	Kansas City (pipe).....0.705	Birmingham.....0.69
Baltimore, export.....0.225	Comb.....0.295	St. Paul.....0.595	Memphis.....0.385
New York, domestic.....0.34	Detroit.....0.295	Omaha.....0.735	Jacksonville, all rail.....0.50
New York, export.....0.255	Cincinnati.....0.295	Omaha (pipe).....0.705	Jacksonville, rail and water.....0.415
Boston, domestic.....0.365	Indianapolis.....0.31	Denver.....1.275	New Orleans.....0.515
Boston, export.....0.255	Chicago.....0.34	Denver (pine).....1.215	

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

RAILROAD EQUIPMENT BUYING

About 1000 Cars Bought and as Many Fresh Inquiries

The Great Northern Railroad has asked for prices on 100 tank cars for fuel oil.

The Pittsburgh, Shawmut & Northern Railroad is inquiring for 200 stock and 50 box cars and 150 to 200 stock car bodies.

The Central Railroad of Georgia has placed an order with the Virginia Bridge & Iron Works for 100 flat cars.

The St. Louis & San Francisco Railroad has let 500 hopper bodies to the American Car & Foundry Co. in addition to the 500 reported two weeks ago.

The Atlantic Coast Line is inquiring for 2000 steel underframe box cars of 40 tons capacity.

The Pacific Electric has awarded 220 dump cars to the American Car & Foundry Co.

The Western Pacific is in the market for 100 gondola cars.

The Great Northern is inquiring for 100 tank cars. The Texas & Pacific has ordered 150 10,000-gal. tank cars from the American Car & Foundry Co.

The Union Pacific has revived an inquiry for 50 caboose cars.

The New York Central system has awarded repairs on 11,000 cars to various builders.

The Elgin, Joliet & Eastern is inquiring for 200 steel gondola cars of 50 tons capacity.

The Peoria & Pekin has placed 6 switch engines with the Lima Locomotive Co.

New York, New Haven & Hartford is inquiring for 10 mountain type engines.

The Texas & Pacific is in the market for 8 Pacific type locomotives.

The St. Louis & San Francisco Railroad has ordered 50 locomotives from the Baldwin Locomotive Works.

FABRICATED STEEL BUSINESS

Shipbuilding Company Gets Large New York Hotel Job—Other Awards

Among the fabricated steel awards of the past week are the following:

An apartment hotel at 299 Park Avenue, New York, 4000 to 5000 tons, to New York Shipbuilding Corporation. Erroneously reported last week as the new Roosevelt Hotel to be built by the United Hotels Co. The latter job, which requires about 5000 tons, is still in the market.

Highway bridge over Passaic River at Paterson, N. J., 400 tons, to Phoenix Bridge Co.

Warehouse for Butler Brothers at Long Island City, 1800 tons, to Levering & Garrigues Co.

Addition to store of Oppenheim, Collins & Co., New York, 250 tons, to Hay Foundry & Iron Works.

Hotel at Manhattan Beach, New York, 400 tons, to Paterson Bridge Co.

Apartment house on West Ninety-fifth Street, New York, 300 tons, to Hedden Iron Construction Co.

Apartment hotel at Park Avenue and Thirty-seventh Street, New York, 650 tons, to Hedden Iron Construction Co.

Cornelia Copper Co., smelter, Ajo, Ariz., 2100 tons, to Wisconsin Bridge & Iron Co.

Robinson Building, Los Angeles, Cal., 2500 tons, to Llewellyn Iron Works.

Three 55,000-bbl. storage tanks, Crockett, Cal., for California Hawaiian Sugar Refining Co., 663 tons, to Pittsburgh Des Moines Steel Co.

Six ordnance buildings for United States Navy, Pearl Harbor, Hawaii, 300 tons, to American Bridge Co.

Allis Chalmers Mfg. Co., West Allis, Wis., plant addition, 250 tons, to Milwaukee Bridge Co.

Power house for Crossett Lumber Co., Crossett, Ark., 221 tons, to American Bridge Co.

Bridge across Bear River near Auburn, Cal., for California Highway Commission, 112 tons, to Minneapolis Steel & Machinery Co.

Crane runways for Richmand, Fredericksburg & Potomac Railroad, 130 tons, to unnamed fabricator.

Mayo Building, Tulsa, Okla., 2000 tons, to Mississippi Valley Structural Steel Co.

Warehouse and storage hopper bottoms for Fred Uhlman, Kansas City, Mo., 124 tons, to unnamed fabricator.

Harrisburg (Ill.) Bank, 70 tons, to Mississippi Valley Structural Steel Co.

Agey & Stead Building, Centralia, Ill., 61 tons, to Mississippi Valley Structural Steel Co.

Structural Projects Pending

Inquiries for structural steel work now being figured on include the following:

Addition to Chelsea Hotel, Atlantic City, 500 tons.

Addition to the Girard Trust Co.'s building, Philadelphia, 1200 tons.

Apartment house on East Forty-eighth Street, New York, 700 tons.

Addition to American Museum of Natural History, New York, 900 tons, James Stewart & Co., low bidder on general contract.

Kalan Bridge over Columbia River for Union Pacific System, 2800 tons, American Bridge Co. low bidder.

Pennsylvania Railroad, grade crossing elimination in New Jersey, 1100 tons.

Bridge in Clarksville, Tenn., 500 tons.

Missouri Pacific Railroad, bridge, 300 tons.

Fair ground grandstand, Russell, Ky., 1000 tons.

Denison University, chapel, Granville, Ohio, 125 tons.

Oxford University, dormitory, Miami, Ohio, 200 tons.

Highway bridge in Tennessee, 500 tons, bids being taken. Highway bridge, Montgomery Co., Ohio, approximately 600 tons, bids in.

Highway bridge, Hamilton Co., Ohio, 300 tons, bids close Oct. 6.

Bascule bridge, Los Angeles, Cal., 2200 tons.

PACIFIC STEEL CORPORATION

Three Companies Merged—To Build Furnace and Steel Plant

SAN FRANCISCO, Sept. 12.—Filing of articles of incorporation in Delaware Sept. 6 discloses the formation of another large steel group for the Pacific Coast, to be known as the Pacific Steel Corporation. It is capitalized at \$20,000,000 preferred stock and 200,000 shares of no par common. The corporation comprises the Pacific Coast Steel Co., San Francisco, Seattle and Portland; the Southern California Iron & Steel Co., Los Angeles, and the Milner Corporation, Salt Lake City, to which possibly will be added the Judson Mfg. Co., Oakland.

It is proposed to manufacture steel products by utilizing the resources of Utah, and extensive iron ore deposits have been acquired, along with coal holdings producing 750,000 tons yearly near the Utah Fuel Co. mines in Carbon County. A blast furnace plant in Utah is to be erected as soon as possible. T. T. C. Gregory, of San Francisco, the lawyer making arrangements, is expected to return from the East to-day.

Railroad Inquiries for 116 Tools

CINCINNATI, Sept. 12.—The Missouri, Kansas & Texas Railroad has issued a list of approximately a half million dollars' worth of machine shop equipment for Bellmead, Tex., shops. The list includes 30 lathes, six planers, six radial drills, six crank shapers, two boring mills, two carwheel lathes, five turret lathes, three grinders, five milling machines, besides shears, bulldozers, box lathes, bolt cutters, pipe threaders and other miscellaneous equipment, all machines to be motor driven with push button control. The list comprises 116 separate classifications.

To get out the large orders booked for castings for locomotives and other equipment the Ohio Steel Foundry Co., Springfield, Ohio, is working longer hours and has increased its force. Part of the force is working ten hours and others 12 hours a day.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits	Lead		Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
Sept.	14.12½	13.75	32.30	5.95	5.60	6.57½	6.22½
6.....	14.12½	13.75	32.37½	5.95	5.60	6.57½	6.22½
7.....	14.12½	13.75	32.25	5.95	5.60	6.60	6.25
8.....	14.12½	13.75	.....	5.95	5.60	6.65	6.30
9.....	14.12½	13.75	32.25	5.95	5.60	6.70	6.35
11.....	14.12½	13.75	32.12½	5.95	5.60	6.72½	6.37½
12.....	14.12½	13.75	32.12½	5.95	5.60	6.72½	6.37½

*Refinery quotation.

New York

NEW YORK, Sept. 12.

Sentiment in all the markets is optimistic and the price tendency is upward. Buying of copper is better, but the tin market has been dull. Although the lead market is quiet prices are a little higher. The indication in zinc points to a scarcity and prices are advancing.

Copper.—Buying in electrolytic copper since the holidays has increased and some substantial orders have been booked at 14c., delivered, or 13.75c., refinery, which is the minimum, any cheaper lots no longer being available. There is also a good inquiry and specifications on contract are also liberal. Some sellers are unwilling to sell at these levels and ask about ¼c. higher. Lake copper is unchanged at 14c. to 14.25c., delivered.

Tin.—With the exception of one day, Sept. 6, the market has been without feature and stagnant and prices have been largely nominal. On that day about 200 tons of Straits tin was sold at a range of 32.25c. to 32.37½c. Prices have hovered close to 32.25c. each day and to-day the quotation is 32.12½c., New York, for spot Straits. Late to-day fairly liberal sales were made. There has also been very little change in the London market, quotations to-day being £158 12s. 6d. for spot standard, £159 10s. for future standard and £159 per ton for spot Straits, all very close to the quotations a week ago. The British market is also without feature. Arrivals thus far this month have been 2510 tons, with 6815 tons reported afloat.

Lead.—A moderate business is reported booked daily for September shipment, but the market is generally quiet and without feature. The rush which characterized this market last month is absent. The possibility of a duty on lead in the new tariff bill, if enacted soon, is having some effect because considerable of the metal and the ore is imported from Mexico. Prices in the outside market have stiffened a little to 5.95c., New York, or 5.60c., St. Louis, with those of the leading interest unchanged at 5.90c., New York, and 5.70c., St. Louis.

Zinc.—A sharp rise in the quotations for prime Western has been established by sales in the last two days. For early delivery sales were made on Saturday at 6.30c., St. Louis, and on Monday at 6.35c., St. Louis, the advance being due to peculiar conditions existing in the market and indicating a possible shortage of the metal. Consumption has been curtailed in the West, due to lack of coal or inability of the railroads to handle the ore and also to scarcity of labor. Some companies would like to increase their output but are unable to do so. These conditions are also attended by a better demand since the practical settlement of the strike and there is also a prospect that there may be a scarcity of the metal in England. Should there develop any demand from that source, this would accentuate the conditions referred to. We quote prime Western for early delivery at 6.35c. to 6.40c., St. Louis, and 6.70c. to 6.75c., New York.

Antimony.—The prospect of an early duty on antimony and the lack of offerings from China have increased values in this market. Wholesale lots for early delivery are quoted to-day at 6.25c. per lb., New York,

duty paid. It is interesting to note that the imports of antimony for the first eight months of this year are only 5308 gross tons, as compared with 7677 tons and 9238 tons in the same months of 1921 and 1920, respectively.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery, are quoted by the leading interest at 19.10c. per lb., f.o.b. plant, with the same grade made by foreign producers offered by importers at 17.75c. to 18c. per lb., duty paid, New York.

Old Metals.—The market is firmer but there has been practically no change in values. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.50
Copper, heavy and wire.....	12.75
Copper, light and bottoms.....	11.25
Heavy machine composition.....	10.50
Brass, heavy.....	8.25
Brass, light.....	6.50
No. 1 red brass or composition turnings.....	9.00
No. 1 yellow rod brass turnings.....	7.50
Lead, heavy.....	5.00
Lead, tea.....	4.00
Zinc.....	3.75

Chicago

SEPT. 12.—The metals remain quiet with lead spelter and antimony slightly higher than a week ago. The old metals remain unchanged. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.70c.; spelter, 6.40c.; antimony, 7.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 20c., tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

SEPT. 12.—The lead market was steady for the week at 5.60c. to 5.65c., car lots, against 5.60c. the previous week, while slab zinc held steady at 6.25c. On old material we quote: Light brass, 3.50c.; heavy red brass, and light copper, 7c.; heavy yellow brass, 4c.; heavy copper nad copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

American Low Bidder on Bridge in Uruguay

WASHINGTON, Sept. 12.—Submitting a figure of 621,000 Uruguayan gold pesos, an American fabricating interest was the lowest bidder for the construction of the Santa Lucia River bridge in Uruguay, which will require 3000 tons of steel. Announcement of the bids was made to-day in a cable received by the Department of Commerce from Commercial Attache Edward F. Feely, Buenos Aires, Argentina. The other bidders were Belgian, 700,000 pesos; Germany, 850,000, and British, 900,000.

Two of the Nagle Steel Plants Sold

The Glasgow and Seyfert plants of the Nagle Steel Co., which has been in financial difficulties, were sold at private sale last week to George H. Heck and associates, 518 Commercial Trust Building, Philadelphia, who will form a company to operate them. The Rahway and Pottstown plants of the Nagle Steel Co. have not yet been sold. The Glasgow works has an annual capacity of 20,000 tons of plates up to 84 in. and the Seyfert works is equipped to produce about the same tonnage of plates. The price paid for the two plants is reported to have been \$90,000.

Wages of Sheet Mill Workers Advanced

YOUNGSTOWN, Sept. 12.—Tonnage rates of sheet mill workers operating under the sliding scale of the Amalgamated Association of Iron, Steel and Tin Workers will be advanced 4½ per cent of the base rate, for the September-October period as a result of the bimonthly examination of sales sheets, held Sept. 11 at Youngstown. The rates for tin mill employees will remain unchanged.

PERSONAL

George F. Downs, president Lackawanna Steel Co., has tendered his resignation effective upon the selection of his successor. Other and important changes in the Lackawanna organization are expected in connection with his withdrawal. Mr. Downs has been president of the Lackawanna Steel Co. since August, 1920, succeeding Charles McCullough, who died April 3, 1920. At the time of his election to the presidency, Mr. Downs was vice-president in charge of operations.

William H. Woodin, president of the American Car & Foundry Co., 165 Broadway, New York, also director of the Westinghouse Electric & Mfg. Co., General Motors Co., American Locomotive Co., and several other companies, has given over to a large extent his duties in these connections to direct his efforts to his new commission as New York State fuel administrator, to which he was appointed by Governor Miller on Sept. 6. The appointment met with general approval, and there is every reason to believe that Mr. Woodin will fulfill his promise to ration the coal equitably and in keeping with established channels of trade. In the 15 plants of the American Car & Foundry Co., Mr. Woodin is a familiar figure. He learned the business from the ground up.



WILLIAM H. WOODIN

Some of his employees can recall the time when he cast his first wheel. Upon entering his father's employ, just after leaving the Columbia School of Mines, he was granted no exemptions. There is an ironclad rule that all officials of the company must spend three years in the works. This he did until one day he took a prize which his father offered for casting the best wheel. From this point, young Woodin left the ranks and rose gradually to president of the company as well as director of several others. Mr. Woodin is a man of genial presence, but of few words. The great responsibilities surrounding his positions are not irksome. In his room hangs a letter commending his prompt delivery of cars during the war, and telling of the resultant savings to the Government. His patriotism again bids him give up some business duties to serve in a large public capacity.

John A. Oartel, chief of the safety bureau, Carnegie Steel Co., will be the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association at the General Forbes Hotel, Pittsburgh, on Monday evening, Sept. 18. His subject will be, "One Hundred Per Cent Safety in the Foundry."

A. D. Neal, formerly associated with the Duquesne Steel Foundry Co., Pittsburgh, in its roll sales department, has joined the sales force, Pittsburgh Rolls Corp., Pittsburgh. Mr. Neal, prior to joining the Duquesne Steel Foundry Co., was with the Carnegie Steel Co. at its Homestead works and in the sales department.

Colonel C. H. Crawford, South American manager of the Baldwin Locomotive Works, and Clifford Shoemaker, Washington, have been appointed representatives of the American Association of Engineers at the International Engineering Congress held this month at Rio de Janeiro. The purpose of the conference is to establish closer contact among those engaged on problems of economic progress in all the Americas.

C. T. Pratt has resigned as treasurer of the Brown Hoisting Machinery Co., Cleveland, and Alex. C. Brown, president of the company, has assumed the ad-

ditional duties of treasurer. J. F. Pierce has resigned as auditor and director of the same company. This vacancy probably will not be filled for the present.

Irving S. Kemp, sales manager Vaughan & Bushnell Mfg. Co., Chicago, has resigned to become vice-president Evansville Tool Works, Evansville, Ind.

J. D. Powell, for several years with L. S. Starrett Co., Chicago, but latterly handling manufacturers' lines, has become associated with the Lufkin Rule Co., with headquarters at Saginaw, Mich.

Robert C. Yates, for many years identified with the Union Drop Forge Co., Chicago, has resigned to become general manager of the Interstate Drop Forge Co., Milwaukee. Mr. Yates, after graduating from Union College, was connected with the American Locomotive Co. at Schenectady, N. Y., and Bethlehem Steel Co. having also been manager for a time of the Chicago district office of Bethlehem. The Interstate Drop Forge Co., which was organized in 1919 for the manufacture of small commercial forgings, is closely allied with the Chain Belt Co., Sivyer Steel Casting Co. and Federal Malleable Co., all of Milwaukee.



ROBERT C. YATES

F. C. Schreiber, formerly with Stocker-Rumely-Wachs Co., machinery dealers, Chicago, but of late in the sales department of the Packard Motor Car Co., has returned to his former position with Stocker-Rumely-Wachs Co.

Mark A. Brown, general manager, J. M. Leach Mfg. Co., Kokomo, Ind., has been appointed general manager of the Globe Stove & Range Co. of the same city.

A. W. Van Buren, formerly Chicago manager of the Betts Machine Co., Rochester, N. Y., has been appointed district sales manager in the Chicago territory of the Consolidated Machine Tool Corp., New York. Charles M. Robertson, who had been Chicago manager of the Dale Machinery Co., has been appointed manager of the Chicago office of the Consolidated Machine Tool Corp.

C. E. Reese, editor of Gas Engineering and Appliance Catalog, and associate editor of *Gas Age-Record*, has joined the Stoker sales department of the Westinghouse Electric & Mfg. Co., at South Philadelphia. He was previously cadet engineer and combustion engineer with Henry L. Doherty & Co., and assistant engineer of the Illinois Public Utilities Commission. Mr. Reese is a graduate gas and electrical engineer and a member of the Editorial Conference and executive committee of the New York Business Publishers' Association, Inc.; American Gas Association, and American Institute of Electrical Engineers.

A number of changes were made recently in the organization of the United Alloy Steel Corporation, Canton, Ohio. H. C. Thomas was promoted from general superintendent to assistant general manager; J. B. Thorpe was appointed general superintendent of the Alloy Division, and H. T. McBratney, general superintendent of the Sheet Division. Mr. Thomas and Mr. Thorpe formerly were connected with the Gary Steel Works of the U. S. Steel Corporation, the former as assistant general superintendent and the latter as open hearth superintendent, both going to the United Alloy Corporation in 1918. Mr. McBratney was for a number of years general superintendent of the sheet mills of the Allegheny Steel Co., Breckenridge, Pa.

Weaver H. Rogers, formerly vice-president and general manager the Pittsburgh Iron & Steel Foundries

Co., Pittsburgh, has organized Weaver H. Rogers & Co., with offices in the Farmers Bank Building, Pittsburgh. The company has been incorporated under the Pennsylvania laws for the purpose of acting as intermediary and in an advisory way in connection with business changes and financial matters.

B. D. Quarrie, vice-president and general manager Otis Steel Co., Cleveland, has been elected a director of the Guardian Savings & Trust Co., Cleveland.

Fay, Spofford & Thorndike, consulting engineers, 200 Devonshire St., Boston, specializing in bridges, industrial plants, commercial buildings, foundations, and port and hydraulic developments, have admitted to partnership John Ayer, Bion A. Bowman, Carroll A. Farwell, Ralph W. Horne, Ralph T. Jackson, George L. Mirick, Barzillai A. Rich and Warren D. Trask, all of whom have long been associated with the firm.

A. W. Robbins, who for the past few years has been identified with the ball bearing industry through his connections with the Standard Roller Bearing Co. and the Bearings Service Co., is now associated with the Bearings Co. of America, and will travel from the Detroit offices of that company, which are located in the Ford Building, Detroit.

OBITUARY

JOHN HALDANE FLAGLER, founder and general manager of the National Tube Co., McKeesport, Pa., died last Friday night, Sept. 8, in his home at Greenwich, Conn., at the age of 70, after a week's illness with pneumonia.



JOHN H. FLAGLER

Although he had virtually retired from business during the last few years, he retained the directorship of several organizations. In the field of finance and in iron and steel circles, Mr. Flagler was a prominent figure for nearly 40 years. His career began with Haldane & Co., New York, with whom he rose rapidly from clerk to manager of the Boston branch. In East Boston, the National Tube Co., had its beginning in 1868. Two years later it was moved to McKeesport where its extensive plants are now operated by the United States Steel Corporation, with which it was merged in 1901. Mr. Flagler contributed several improvements to the steel industry, among which was a new method of uniform heat treatment. He was also instrumental in the introduction of gas for furnace use. At the time of his death, Mr. Flagler had been director of the National Bank of North America and the American Union Line Insurance Co. Besides his wife he leaves a daughter, a sister and a brother, Harvey K. Flagler.

FREDERICK W. COOKE, aged 62, for many years general manager Cooke Locomotive Works, Paterson, N. J., a subsidiary of the American Locomotive Co., died last Sunday, Sept. 3, from heart disease in his summer home, Quoque, L. I., following a brief illness. He was a graduate of Stevens Institute. His father, John Cooke, was founder of the Cooke Locomotive Works, which was sold to the International Power Co. in 1901, and in 1907 passed into the hands of the American Locomotive Co. F. W. Cooke remained general manager until he retired in 1914.

EDWARD B. RAYMOND, vice-president in charge of operations, Pittsburgh Plate Glass Co., also consulting engineer and a director, Pittsburgh Valve & Fittings Co., dropped dead in his office, Frick Building, Pittsburgh, Sept. 8. He was 53 years old and a native of

Massachusetts. He was a graduate of Massachusetts Institute of Technology and was with the General Electric Co., Schenectady, N. Y., for several years.

EDWIN NEWTON OHL, whose death was reported in THE IRON AGE, Sept. 7, was born in Ohltown, Ohio, 72 years ago, but went to Sharon, Pa., more than 50 years



EDWIN NEWTON OHL

ago and long had been a prominent figure in the iron and steel industry. In Sharon he was associated with Peter Kimberly, a pioneer steel man in that district. In the early '90's, he went to New Castle, Pa., to become associated in the steel business with A. W. Thompson, afterward president, Inland Steel Co., Chicago. When the Atlantic Iron & Steel Co., New Castle, of which Mr. Ohl and Mr. Thompson were officers, was absorbed by the Republic Iron & Steel Co., Mr. Ohl became vice-president and general manager of that company. He was one of the

organizers of the Cherry Valley Iron Co., with a furnace at Leetonia, Ohio, now owned by the Hanna Furnace Co., Cleveland, of which company Mr. Ohl was a director at time of his death. He was also vice-president of the Miami Iron & Steel Co., Hamilton, Ohio, which was succeeded by the Hamilton Furnace Co. in 1917. He went to Pittsburgh about 30 years ago and made his home in that city thereafter. He was a member of the American Iron and Steel Institute and was president of the American Roller Bearing Co., Pittsburgh, a director the Keystone National Bank, Pittsburgh, of the Republic Casualty Co., of the Valley Steamship Co., and of the Amortization Mortgage Co. He is survived by Mrs. Ohl, a son, Edwin N. Ohl, Jr., a student at Harvard University, and two brothers and three sisters.

JOHN H. TOBIN, former vice-president, Wehr Steel Co., Milwaukee, died Aug. 23 at his summer home at Muskego Center, Wis., following an illness of several months. He was 64 years of age.

JOHN A. LEONARD, business manager of the Crane Co., Bridgeport, Conn., died at his home in Bridgeport on Sept. 2. Mr. Leonard was 50 years old, having been born in Livermore Falls, Me., Oct. 25, 1872.

JAMES W. KINNEAR, attorney and business man, Pittsburgh, died at Rochester, Minn., Sept. 8. He was president of the American Stainless Steel Co., vice-president Firth-Sterling Steel Co. and Washington Steel & Ordnance Co., also a director of the Pittsburgh Cold Rolled Steel Co. He was born in Tidioute, Pa., Aug. 2, 1850.

JOHN MILTON POTTER, treasurer Northwestern Mal-leable Iron Co., Milwaukee, died Sept. 6 at the age of 61 years. He was born in Elmira, N. Y., and went to Milwaukee as a youth, being connected with the Northwestern company 32 years ago.

A. N. WHEELER, president Standard Foundry & Mfg. Co., DeKalb, Ill., died Aug. 29, at the hospital at Rochelle, Ill., following an operation. Mr. Wheeler was born in New York in 1850.

The Dutch steamer Bellatrix, which brought 4700 tons of soft coal from Immingham, England, was unloaded in nineteen hours by John Grace's Sons with their ore and coal discharging plant at the Girard Point terminals on the Schuylkill, Philadelphia.

Strike of the employees of Kelly & Jones Co., Greensburg, Pa., which caused a suspension of operations has been amicably settled and the plant is again running full.

British Iron and Steel Market

American Buying of British Pig Iron Has Reduced Stocks—British Steel Prices Weakening in Face of Better Demand

(By Cable)

LONDON, ENGLAND, Sept. 12.

America continues to purchase pig iron from British makers, with the result that stocks are decreasing and prices firm. Cleveland producers have relighted two more furnaces. Scotch producers are contemplating restarting others. Prompt supplies are scarce and most makers are now quoting for November shipment.

There is improved demand for hematite on spasmodic Continental sales. Quotations are firm.

Demand for finished steel is improving. North-eastern ship repair plants are getting orders, but price concessions still are necessary in most cases.

British Mannesmann [seamless rolled] tube makers have secured large orders for oil pipe lines in Burma.

British iron and steel exports for August totaled 269,983 tons.

Continental iron and steel is quiet, with India and China the chief purchasers, but only in moderate parcels. Few Belgian works are able to offer merchant bars before November or December delivery.

Tin plate is quiet but steady. Recent oil plate orders now total 500,000 boxes [first reported at 250,000 boxes; last week increased to 350,000]. Canada has made small purchases. The Far East is quiet.

Galvanized sheets are quiet but there are signs of improving inquiry.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.46 per £1, as follows:

Durham coke, delivered	£1 6½s. to £1 7s.	\$5.91 to \$6.02
Cleveland No. 1 foundry	4 17½	21.74
Cleveland No. 3 foundry	4 10	20.07
Cleveland No. 4 foundry	4 7½	19.51
Cleveland No. 4 forge..	4 5	18.95
Cleveland basic	4 0	17.84
East Coast mixed	4 9 to 4 11½	19.85 to 20.40
Ferromanganese	15 0	66.90
Ferromanganese*	14 10 to 14 15	64.67 to 65.78
Rails, 60 lb. and up...	7 5 to 8 0	32.33 to 35.68
Billets	7 2½ to 8 0	31.78 to 35.68
Sheet and tin plate bars, Welsh	7 7½	32.89
Tin plates, base box...	0 19¼ to 0 19%	4.26 to 4.32
C. per Lb.		
Ship plates	8 15 to 9 5	1.74 to 1.84
Boiler plates	11 10 to 12 0	2.29 to 2.39
Tees	9 0 to 9 10	1.79 to 1.89
Channels	8 5 to 8 15	1.64 to 1.74
Beams	8 5 to 8 15	1.64 to 1.74
Round bars, ¾ to 3 in.	9 0 to 9 10	1.79 to 1.89
Galvanized sheets, 24 g.	16 5 to 16 10	3.23 to 3.28
Black sheets	12 0	2.39
Steel hoops	11 0 & 11 10*	2.19 & 2.29*
Cold rolled steel strip, 20 g.	23 2½	4.60
Cotton ties, Indian specifications	15 0	2.99

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:		
Belgium, October....	£4 2½s.	\$18.40
Luxemb'g, October..	4 2½	18.40
France, October	4 2½	18.40
Billets:		
France, Oct., Nov...	5 10 to £5 15s.	24.53 to \$25.65
Luxemb'g, Oct., Nov.	5 10 to 5 15	24.53 to 25.65
Lorraine, Oct., Nov.	5 10 to 5 15	24.53 to 25.65
Wire nails (keg basis):		
Germany	0 14½	3.23
Belgium	0 20½	4.57
Wire rods, 5 mm. (0.2 in.):		
Belgium	7 5 to 10 7½	32.34 to 46.27
Angles:		
Belgium, September..	7 7½	1.47
Tees:		
Belgium	8 5	1.64
Merchant bars:		
Belgium, Nov., Dec..	7 10 to 7 12½	1.49 to 1.52
Luxemb'g, Nov., Dec.	7 10 to 7 15	1.49 to 1.54
France, Nov., Dec...	7 7½ to 7 12½	1.47 to 1.52
Germany, Dec.	7 12½ to 7 15	1.52 to 1.54
Joists (beams):		
France, Oct., Nov...	6 17½ to 7 2½	1.37 to 1.42
Belgium, Oct., Nov..	6 17½ to 7 2½	1.37 to 1.42
Luxemb'g, Oct., Nov.	7 0 to 7 2½	1.39 to 1.42

Channels:		
Belgium	7 10 to 7 12½	1.50 to 1.52
½-in. plates:		
Germany, Nov., Dec.	8 0	1.59
Belgium, Sept., Oct..	7 10 to 8 0	1.49 to 1.59
Luxemb'g, Oct., Nov.	7 17½	
France, not offered.		
½-in. plates:		
Germany	9 0	1.79
No. 8 gage wire:		
Belgium, August ...	14 10%	2.89

BLAST FURNACES RESUME

Numerous Steel Works Stacks Added to Active List or Will Be Soon

PITTSBURGH, Sept. 12.—Resumption by blast furnaces in western Pennsylvania, Wheeling and Valley districts has gained momentum in the past week and to-day of a total of 139 furnaces in those districts 68 are active. That compares with a minimum of 50 in the closing week of August and 76 in blast in early July, before the railroad shopmen's strike made the coal strike effective. Since preparations are being made to start up several more furnaces in the near future, the prediction is safe that by Oct. 1 there will be as many, if not more, active stacks as there were in July.

All but one of the furnaces which have resumed are steel works as distinct from merchant stacks and the one merchant furnace which has resumed is making Bessemer iron for ingot molds and at the moment is not strictly in the merchant class. Most of the merchant furnaces in this and nearby districts depend upon the Connellsville district for coke supplies and right now it is almost impossible to line up tonnages in that district because the strike of the miners and oven operatives has not been settled and production still is very limited in relation to potential capacity. The wages now being paid in the Connellsville region are satisfactory, but a good many men now are members of the union and insist upon recognition of the union as a condition of their return to work. This the operators decline to do. The prices which prevail on the moderate offerings of bee hive oven furnace coke are too high to interest merchant iron producers at the present prices of iron. The steel companies do not have this obstacle to contend with since most of them have by-product plants and are able to get ample supplies of coking coal.

In the Pittsburgh district, seven furnaces have been added to the active list in the past two weeks. The Jones & Laughlin Steel Co., which during the pinch in the fuel supply had only two furnaces on, already has put on four furnaces and has ordered on two more, one of which is to make ferromanganese. The company plans to have 10 furnaces on by the end of the month. The Carnegie Steel Co. has one more furnace active in this district than it had during the last week of August, 25 of 34 stacks here now being active. It is reported that the Pittsburgh Steel Co. is getting ready to start up its second furnace and also that the Pittsburgh Crucible Steel Co. will turn on the blast in one of its furnaces soon.

In the Mahoning and Shenango Valley districts, 21 furnaces of a total of 48 now are making iron, a gain of nine in the past two weeks. Brier Hill Steel Co. has put on two stacks, Republic Iron & Steel Co. two, Sharon Steel Hoop Co. one, Shenango Furnace Co. one and Youngstown Sheet & Tube Co. three. The A. M. Byers Co. soon will light its Mattie furnace at Girard, Ohio, and blast will be turned on to-night at the Trumbull-Cliff furnace and a second Shenango furnace company stack will go on shortly. Starting up of one of the furnaces at the Farrell, Pa., works Carnegie Steel Co. is an early possibility.

In the western Pennsylvania district, including Johnstown, five of 17 furnaces are in blast, these all being Cambria Steel Co. furnaces. This is a gain of three furnaces by that company. In the Wheeling district, three out of 15 stacks are in blast, two at the Mingo, Ohio, works Carnegie Steel Co. and one at Labelle Iron Works, Steubenville, Ohio. The stack of the Weirton Steel Co., Weirton, W. Va., was banked last Thursday.

The Three-Shift Day at Steel Works

(Continued from page 658)

in consequence of better care, better attention, better morale, or increased alertness or expertness on the part of the men:

1. Increased efficiency, due in part to better physical and mental condition of the men, and in part (after the industry has been working the shorter hours for several months or years) to a better class of men attracted by better working conditions. This increased efficiency has manifested itself in increased production per man per hour and per machine per day, thus decreasing overhead expense. It has also appeared in better conduct of the operations, greater uniformity and regularity of operation and of quality of product, less fuel used, less waste, less repairs of equipment, better life of apparatus, etc.
2. Better morale, resulting in less absences, less tardiness, less shirking, and better discipline. The better discipline is due in part to the spirit of the men, and in part to the pressure which the foreman can, and will, exert, because he does not have to hold back out of sympathy for tired men.
3. Elimination of the "floating gang." This floating gang is an expedient, not a real remedy; it is an expense; it does not content the men, because it gives them their free day only occasionally on Sunday.
4. Finally an advantage which is not to be lightly considered in the event of labor disputes, the company which is working its men only 8 hours a day enjoys much greater prestige with the public, whose influence in a labor dispute is always important. This influence may, indeed, be the factor which decides whether a strike is long and costly, or short and comparatively inexpensive. The 12-hour shift, even with resting periods, leaves something to be explained to the public; necessitates a campaign of education at a time when the public is not always ready to be educated.

Comparative Labor Costs of 12-Hour and 8-Hour Shifts

It has often been pointed out that, in the ultimate analysis, the total cost of any manufactured product is composed chiefly of labor. To illustrate: Pig iron is made, by means of labor, out of ore, flux and fuel.

The cost of the materials used is far greater than the cost of the labor, but labor produced the ore, the flux, and the fuel; and so it can be shown that labor is the basis of all cost, if one goes back far enough. However, the labor cost in the iron and steel industry, as affected by the 12-hour vs. the 8-hour shift is only a fraction of the total cost. To return to the illustration: The ore, the flux and the fuel do not represent any labor on the 12-hour shift basis, except a fraction of the cost of the fuel in some cases. And the operating labor in the manufacture of pig iron is only from 5.5 per cent to 8 per cent of the total manufacturing cost, while that much of it which still works on the 12-hour shift is a still lower percentage. So that those persons who argue, as some do, that the change from the 12-hour to the 8-hour shift would effect an increase of 90 per cent in the cost of the product are dealing in generalities which will not bear analysis.

Likewise, in the case of the open-hearth furnace: At least 50 per cent of the raw material used in the open-hearth is scrap, the price of which is determined by market conditions, and is not affected by any proposed change in the labor in the industry from 12-hour to 8-hour shifts.

Finally, only a part of the laborers in the industry are working the 12-hour shift. If that proportion of the men were changed to the 8-hour shift, and paid as much per day as they are now receiving for 12 hours' work, without, at the same time securing any compensating economic advantages through increased efficiency, increased morale, etc., the total manufacturing cost would be affected by only 3 per cent to 15 per cent. This is, in most cases, less than the variations in cost already experienced by plants competing with one another, due to efficiency of equipment, technical skill, wisdom in purchasing, location, capital resources, overhead expense, etc. If the increase in labor cost were compensated, at least in part, by resulting or accompanying economies in operation, the result would be correspondingly better.

As a matter of actual experience, it is known that some plants, or departments of plants, have changed from the 12-hour to the 8-hour shift and reduced their labor costs. Others are operating on the 8-hour shift with satisfaction to their management and stockholders. Others have changed and reduced their total manufacturing cost. Finally, there are other plants which have had experience with the 8-hour shift, the exact economic result of which is not known, but as to which there seems to be reason to believe that the total manufacturing cost is, at most, not much greater when working the 8-hour than the 12-hour shift.

Considerations That Have Held Back the Three-Shift Day

Mr. Drury's report consists of 125 typewritten pages and deals with the two-shift and three-shift day in the continuous industries. Such industries are considered under four group heads. The first group takes in iron and steel, non-ferrous metals, glass, Portland cement, lime, brick and pottery. In view of the prominence given to Mr. Drury's first report, comparing two-shift and three-shift operations in the iron and steel industry, we give below the portion of his Boston report dealing with iron and steel:

THE steel industry has received separate consideration in three special reports which may be considered as parts of this investigation.¹ In order, however, that the steel industry, which is by far the most important of the continuous industries, may not be omitted from the present general survey, there will be inserted a sketch of the general situation as respects hours.

For almost a generation, a few minor branches of iron and steel making have been carried on on three

shifts, or an approximate equivalent. This has been true of the making of wrought iron and of what are known as "hot mills" in sheet mills. Here and there a few specially difficult jobs have been on eight hours; and once in a great while, an entire department. But these places where custom has long established an eight-hour shift occupy a small place in the steel industry as a whole. Prior to the war, the major branches of the steel industry were, practically without exception, operated on a two-shift basis. About one-half or a little less than one-half, of the employees in the continuous plants were on day work, which was usually ten hours. The other half (or more) of the employees worked twelve hours, or an alternation of eleven hours one week and thirteen the next (or ten hours one week and fourteen the next). In 1919, the United States Steel Corporation gave the number of its twelve-hour employees as between 69,000 and 70,000 and the number in the entire industry probably ran as high as 150,000.

Formerly steel plants were also on a seven-day week. But beginning about a dozen years ago, efforts

¹ See "The Three-Shift System in the Steel Industry," a paper read by the writer before a joint meeting of the Taylor Society, the Metropolitan and Management Sections of the American Society of Mechanical Engineers, and the New York Section of the American Institute of Electrical Engineers, in New York, Dec. 3, 1920, and published in the February, 1921, issue of the *Bulletin* of the Taylor Society. A more analytical study by the same writer, entitled "The Technique of Changing from the Two-Shift to the Three-Shift System in the Steel Industry," was prepared for the Cabot Fund, and a small edition privately distributed in May, 1922. This has not yet been released for general publication. See also Bradley Stoughton's report.

have been made to reduce the volume of seven-day work. Seven-day work is almost entirely extinct in rolling mills and to a large degree is absent in open-hearth and Bessemer work. Coke ovens and blast furnaces must, however, run seven days a week. In these branches of the industry the Steel Corporation and some of the "independents" have adopted arrangements by which the individual men are relieved one day in the week. Others among the "independents" still employ the men in these departments, a full seven days a week, as is true also of open-hearth work when business is normal.

Tendency to Shorter Hours

At one time it was thought that the steel industry could not be operated on any other basis than two shifts. Later, any tendency towards shortening hours was counteracted by the introduction of labor saving machinery; which has gone so far in the steel industry as practically to remove the strain from the majority of jobs. Furthermore, such work as is left is generally intermittent, so that, in most cases, the twelve-hour steel worker does not actually work more than 6 or 7 hours. Combined with these conditions, which seem to make a twelve-hour shift feasible from the physical standpoint, there were many, especially among the foreign born steel workers, who were willing and eager to work for as long as twelve hours, provided that by so doing they could earn slightly more money. Finally, the tendency towards ten or eleven hours for the day shift and thirteen or fourteen for the night shift, represented a crude approach to a ten-hour day, for on the long night shifts there was usually a certain amount of sleeping. All of these considerations together somewhat mitigate—but they do not remove—the fact that an average daily employment of twelve hours, added to the hour or so lost in coming and going, keeps a man away from his family or his other outside interests a large portion of his waking hours.

During the war, there was some tendency towards three shifts in the steel industry, in harmony with the larger movement in this direction which was taking place outside. But the movement did not reach very large proportions, partly because there was in the industry an acute shortage of labor, and in steel towns a shortage of houses, which made the large companies hesitate to attempt to put on an extra shift. By the end of 1920, about twenty of the "independent" steel plants—some large, but more of them small—had gone to three shifts—a number impressive enough to deserve some attention, but not large enough to affect very greatly the proportion of twelve-hour works in the industry. Thus as late as the beginning of the present period of depression, the steel industry was apparently almost as fully on a two-shift basis as it had ever been.

There is reason for believing that a changed attitude had been developing influenced by:

1. The general pressure throughout the country towards shorter hours;
2. The steel strike in 1919;
3. The attacks on the twelve-hour day in Congress;
4. The Inter-Church report on the steel industry; and
5. The conviction on the part of many steel men that the twelve-hour day was too long a period for men to work.

The Steel Corporation's Position

The Steel Corporation had appointed a committee empowered to consider and report on the practicability of abolishing the twelve-hour day. As the pressure for production and the shortage of labor in the steel industry subsided in the fall and winter of 1920-1921, the work of this committee became more active. A number of statements were issued regarding the progress of the committee's work; and finally, in the spring of 1921, Judge Gary issued for the corporation a statement to the effect that the corporation hoped to be able to eliminate the twelve-hour day, as the difficulties of doing so were overcome.

There is reason for believing that the officers of the

Steel Corporation regarded the statement cited as a definite declaration of policy on the part of the corporation, that they intended to be understood as announcing a program of abolishing the twelve-hour day in corporation plants within the course of a year or so. But the statement was embodied in explanations as to the difficulties in the way of abandoning twelve hours. It came at a time when throughout the country there was a tendency towards lengthening rather than shortening hours. The Steel Corporation's proposed course met the moral opposition of some of the "independent" steel manufacturers. The investigator found during his studies in 1921 that there was a prevalent impression abroad both among the "independent" producers and the outside public, that the matter of abolishing the twelve-hour day had been allowed to drop.

Without calling into question the sincerity of the Steel Corporation's intention of eventually eliminating twelve-hour work, there can be no question that, by the time the Corporation had issued its statement, conditions were rapidly becoming more unfavorable for going to three shifts. A moderate slackening in business activity would have been favorable to introducing a third shift; but the depression which came on the steel industry was so severe that, while it interposed no mechanical obstacle to going to three shifts, it yet had the effect of turning people's thoughts in quite other directions. There were times in the summer of 1921 when steel production fell as low as thirty per cent of normal or lower. During this time overtime was abolished and wage rates on twelve-hour work were reduced almost one-half.

Business Conditions Made the Decision

Under these conditions the question of re-organizing the system of shifts in the steel industry was perhaps not unnaturally put in the background, while thought was turned on problems which were for the moment more grave. Moreover, men hesitated to put into effect a reduction of hours by one-third, when wages had just gone down by one-half; or to talk of making changes which might increase cost, when cost was already above selling price. What enthusiasm could be aroused for getting out more output, when, in some of the plants, at least, the greater the output the greater the losses? For reducing labor force when it meant discharging key men, whom it was desired to keep on the pay roll? Why shorten hours when men were fortunate if they had employment one week out of two? It is not surprising, considering the many harassing circumstances, that for some months practically no thought was given to making any far-reaching changes in the shift system.

It does appear that from the standpoint of external conditions and from the sentiment in the industry circumstances were favorable in 1920 and 1921 for the Steel Corporation to have changed from a two to a three-shift basis. Some "independents" believed that the corporation was going to make a change and they had their new manning schedules ready so that they too might promptly change.

There was no reason, however, why shifts could not in many cases be shortened during 1921, even if the development of a permanent three-shift system had to come later. In fact, the very depression and accompanying unemployment were the strongest of reasons why work should, wherever practicable be divided among as large a number of men as possible through shortening the hours worked by individual workers. And this course, was in fact, followed to a large extent. The movement, however, had its drawbacks and limitations. In some cases, the older and more valuable employees, whose incomes had already been radically affected by cuts in the hourly rates and perhaps by temporary transfer to positions below their regular grade, were unwilling to have hours reduced, in order to give work to men who belonged to the less stable element of workers. There is some risk in a company's going too far in giving all employees a small amount of work as competitors may coax away the pick of the employees by offering full-time employment. This general situation was the cause of some oscillation between twelve-hour and eight-hour shifts.

Notwithstanding the circumstances just discussed, the proportion of twelve-hour work in the steel industry was materially reduced during 1921 but all of this was not done as a matter of permanent policy. Most of the reduction in hours was by way of putting what had been on two twelve-hour shifts on two ten-hour shifts, or by having as much of the shift work as could be done by day workers. Thus the Steel Corporation ran rolling mills on ten-hour shifts. All sorts of arrangements as twelve, ten, nine, eight and even six-hour periods have been in use. Men were also worked a week and laid off a week. The net result was a substantial reduction in the amount of twelve-hour work. At times the proportion of twelve-hour workers in plants would be only ten or fifteen per cent, whereas formerly the common proportion was fifty or more per cent. The tendency was to retain on twelve-hour shifts only such work as absolutely had to be continuous through the twenty-four hours.

While some of these innovations of 1921 could be maintained as a part of permanent shift policy, yet it is evident that much of the development is essentially temporary. If and when the steel industry recovers, it is doubtful if large plants will want to run their rolling mills only twenty-hours out of the twenty-four. Nor did the steel mills in 1921 do much to lessen the proportion of twelve-hour work on blast furnaces, open-hearth furnaces, or other continuous-process work. In the absence of some firmer policy than was followed in 1921, there would likely be a drifting back towards the twelve-hour day in the steel industry as times improve.

We will omit for the steel industry the presentation of evidence regarding the results which have been met with in such plants as have gone to three shifts; because the facts have been published separately. It is opportune to say here that most of the plants reported upon in 1920 now state that they have lost some by operating upon the three shifts. However, in almost all cases, the managements state that, considering the intangible as well as the tangible factors, they were better satisfied with three-shift than with two-shift operation. One of the larger of the three-shift plants mentioned in the 1920 report went back to two shifts at the beginning of 1921 (as was noted in the paper as published) stating that the arrangements had not worked well. Such of the other three-shift plants as the writer has been in touch with have remained on three shifts.

Favorable Testimony

In fact, the evidence after a year of depression is now considerably more favorable to three-shift operation than it was in 1920. This would seem to be the case, partly because, down to the close of 1920, conditions were not favorable for getting the greater efficiency which might be expected on shorter hours, and because of more experience and hence the management would have more confidence in the change. Thus only a few miles from the company which in 1921 returned to two shifts, another plant, engaged in all the states of steel manufacturing from blast furnace to rolling mills, had reported in 1920 that its labor costs were almost, but not quite, as low on three-shift as on two-shift operation. A year later they were in the position of doing better on three shifts than on two. This

company followed a policy of giving ten hours pay for eight hours work.

Another prominent steel company, which followed a policy of paying as much for eight as for twelve hours, was cited in the 1920 report as coming out almost even. But at that time the company was reluctant to pronounce its three-shift system a permanent success until it had withstood depression as well as prosperity. In the fall of 1921, this company reported that in its producing departments—open-hearth and rolling mills—it would not gain anything by going back to two shifts. In the service departments expenses would be cut to some extent if the company were willing to go back to two shifts; but as to the amount of the loss which three-shift operation meant in these departments, the company was not certain. It did not intend to go back to two shifts.

Another three-shift company, whose plant ranks among the largest in the steel industry, and whose employees originally petitioned for and accepted three shifts on a basis of no higher earnings per hour than were paid in two-shift plants, reported in 1920 that its manning had increased 50 per cent. In January, 1922, this company gave the increase as 35 to 50 per cent; and, after reiterating its feeling of satisfaction with the working of three shifts, added: "We are strongly opposed to twelve-hour working shifts, though not opposed to a ten-hour day where conditions seem to make that desirable. We believe that industry in this country can be so conducted as to permit of eight-hour shifts in continuous operations."

Eight Hours at Ten Hours' Pay

The evidence collected in 1920 and a weighing of the experience of 1921 and 1922 would indicate that it is doubtful whether all the departments of a steel plant can be operated as cheaply on three shifts as on two shifts, if the men receive as much pay for eight hours as for twelve. But there is tangible evidence strengthened by the developments of the last year, which indicates that under active and able management and with reasonable co-operation on the part of labor, costs on the three-shift system can be kept as low as on the two-shift system, provided wage rates are compromised so that eight-hour men receive pay equivalent to ten hours work instead of for twelve hours pay. Such a compromise, or even one less liberal, is ordinarily satisfactory to the men.

At the same time care should be taken not to be over confident. Most managements do not give the attention which they might give to the matter of securing the highest attainable degree of labor efficiency; so that it is probable that, in case of a general change from two to three shifts in the steel industry, assuming a fifty-fifty compromise on daily wages, the greater proportion of the plants, for the time being at least, would note some increase in labor cost. But, as has been shown in the two special reports on steel, this increase in cost could not be large; and there is no reason why it should not be practically offset by intangible improvements in relations and operations, due to the plant being on a more satisfying day.

It is very significant that, during the late period of very acute depression, exceedingly few companies, either in the steel industry or in other industries, have seen fit to go back from eight-hour to twelve-hour shifts.

Total Manufacturing Cost Would Be Increased by 3 to 15 Per Cent

The Federated American Engineering Societies' Committee on Work-Periods in Continuous Industry, in summarizing for last week's Boston meeting the reports of Messrs. Stoughton and Drury, devote a short chapter to the iron and steel industry. Some extracts are given below from what the committee says in commenting on the three-shift and two-shift systems:

IN 1919, the United States Steel Corporation employed approximately 70,000 12-hour employees. Altogether, there are perhaps 150,000 wage earners in the entire steel industry on 12-hour shifts.

A wise executive policy takes into full consideration the importance of the intellectual, the psychological and

the physical well-being of labor, realizing that an immediate saving secured by over pressure inevitably becomes a loss in the long run. A refusal to co-operate on the part of the workers is an economic loss. Furthermore, it is obviously of no permanent benefit to the men if their hours are shortened beyond the point where

the industry can survive under competitive conditions.

The twelve-hour day is strongly established in the iron and steel industry by long custom and by its unusual adaptability to production requirements. Recent progress, however, has been in the direction of a shorter day as well as in the reduction of the proportion of men on duty seven days a week. This is shown by the following tabulation which gives the percentage of men so employed:

	7 Days per Week Per Cent		Working 12 Hr. Per Cent	
	1910	1920	1910	1920
Blast furnaces	75	29	69	63
Bessemer mills.....	18	12	65	75
Open-hearth	24	17	76	50

The above figures are from a Report of the U. S. Department of Labor, released for publication May 24, 1922, and on Documents Nos. 110 and 301 of the 62d Congress. From the same publication the following figures are also compiled showing the percentage of laborers in the same three departments working the long shift and the short shift respectively in 1910 and 1920.

	Working 12 Hr. Per Cent		Working 8 Hr. Per Cent	
	1910	1920	1910	1920
Blast furnaces.....	69	63	1	18
Bessemer mills.....	65	75	16	22
Open-hearth	76	50	2	30

The proportion of men working 12 hours in the Bessemer mills is an exception to the general trend, but the Bessemer process has been on the wane for many years, and the number of men employed is probably very much reduced since 1910.

It is emphatically asserted by blast furnace managers working the eight hours that the higher grade of labor attracted by the shorter hours, the greater care and alertness, better work, and more skilful operation are all reflected in a saving in cost of production. Cost figures are confidential, but furnace operators working under the 8-hour day assured the investigator on more than one occasion that the cost of producing pig iron is less on the eight-hour than on the 12-hour day.

The operating labor in the case of pig iron is from 5.8 to 8 per cent of the total manufacturing cost. Only

a part of the labor in the industry is working the 12-hour day. If that labor was changed to the eight-hour day and paid as much per day as it is now getting for 12-hour work even without securing any compensating advantages through increased efficiency, morale, etc., the total manufacturing cost of the product would be increased only from 3 to 15 per cent. This is in most cases less than the variations in cost already experienced by competing plants, due to difference in efficiency of equipment, technical skill, purchasing, location, capital resources, overhead expense and advantages due to good management.

The United States has the most profitable iron and steel industry in the world, making more money and more output than all the rest of the world put together and exporting its product in successful competition with foreign countries. The majority of managers and executives with whom the matter was discussed believe that the good of the industry can be better served by eliminating the 12-hour day than by increasing dividends provided by means of labor saving devices and in other ways this step can be taken without serious injury to the industry.

As a matter of actual experience it is known that some plants have changed from the 12-hour to the eight-hour day and reduced their labor costs. Others have reduced their total manufacturing cost. Others are operating on the eight-hour day with satisfaction to management and stockholders. Results in such plants may be summarized as follows:

- The plants which have adopted the three-shift system, though paying wages a little less than is paid in corresponding plants working 12-hour shifts, have sufficient labor, both skilled and unskilled.
- The management believes that the shorter hours attract a better class of labor.
- Every executive interviewed stated that the labor turnover is less on the three-shift system than on the two-shift system.
- Sufficient skilled labor can be trained in the plant if the change is made with the co-operation of the men, and if it is made gradually.
- It is unnecessary to pay a full 12-hour wage to skilled labor to secure a sufficient number to work the 8-hour day.

Immigration Law Has Proved Unsatisfactory

Secretary Davis Says Temporary Measure Has Outlived Its Usefulness—Various Plans Proposed

WASHINGTON, Sept. 12.—While industrial interests of the country are complaining of threatened shortage of labor that promises to be serious, and are strongly of the opinion that the immigration laws should be liberalized, so as to admit more workers, it is a perplexing problem as to how this may be done satisfactorily. It is evident from correspondence coming to members of Congress and the Department of Labor that employers, in view of the many labor troubles that have developed since the signing of the armistice, are showing more interest in the quality of the immigration than heretofore. That the Administration is alive to the situation is evident by repeated statements coming from the Department of Labor and from members of Congress.

In a formal statement recently, Secretary of Labor Davis said that the 3 per cent immigration restrictive law, enacted one year ago to halt immigration, had outlived its usefulness, declaring that "a radically different program for dealing with the immigration problem" must be evolved. Mr. Davis maintained "that the 3 per cent law has served very well as a temporary measure under the conditions responsible for its enactment," but "a permanent policy should be upon an entirely different basis." Criticism was made by Mr. Davis and some industrial interests share the same view that immigration stock which has played so important a part in the upbuilding of America is not

forthcoming under the present program. Figures show that the quota of immigrants allowed under the 3 per cent law has been either entirely filled or exceeded where it relates to the most undesirable types, but there is a deficiency of the more desirable class of immigrants. It is charged that this is one element that has played an important and serious part with regard to agitation and in connection with labor troubles. It is, of course, well known that organized labor has always advocated stringent and unduly restrictive immigration laws, including such absurd provisions as the literacy test and would welcome further obstacles to immigrants. The attitude of the Department of Labor often has been criticized for being entirely too sympathetic with the attitude of organized labor. Secretary Davis in the program he has outlined has taken into account the quality of immigration and based his reasoning on a theory that has been advocated by industrial economists. Mr. Davis makes the point that under the present passport systems in effect throughout the world power is lodged in the hands of foreign governments to say who shall and who shall not migrate to the United States. He said that the selection of America's future citizens "is therefore reposed in some other government which may refuse passports and keep at home those whom it wishes not to leave." The remedy he proposes would be to empower American officials at ports of emigra-

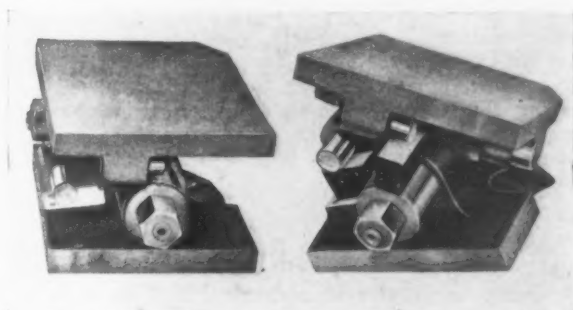
tion, in lieu of visé requirements, to subject aliens to examinations involving mental, physical and other characteristics so as to insure immigrants of a constructive type. Legislation of this character already is pending before the House Committee on Immigration and probably will be pressed for passage at the next regular session of Congress. It is quite conceivable that the program will carry provisions of such a restrictive character that they will be opposed by industrial interests, but at the same time it is known that many of them favor the basic principle of raising the quality of immigration, rather than of lowering the quantity and thereby to bar incoming aliens of radical tendencies. Many of them, it has been pointed out, do not constitute a laboring class, and consequently do not add to the labor supply, but do engage in industrial agitation.

Mr. Davis said that it is not the intention of the Department of Commerce to create an espionage system as a check upon alien residents of the United States, but said there should be an annual census of the foreign born who are not naturalized citizens. He also said that an annual fee should be demanded of each alien, the money to be used to educate the immigrants. Such a system, he believed, would permit the checking up of all of those who have violated the law in securing admission to the United States.

"If their regard for American law is such that they violate it in the first place by illegal entry," he added, "how can we expect that they will have any more regard for other laws? We will be able to trace surreptitious entries of Orientals, and we will be in a position to know our self-appointed enemies who are designing to rule America by revolution, as opposed to our settled principle of advanced government by evolution."

Sine Plate for Compound Angle Work

The numerous precision grinding operations encountered in modern tool-room problems frequently include operations of grinding compound angles. These generally have to be handled by some make-shift device or



Multi-Angle Sine Plate Designed to Set Work to a Compound Angle by Simple Angles Measured by Simple Sine Bar

by setting a simple sine bar to an angle determined from mathematical calculations that will produce the compound angle. To provide an easy and economical means of setting work to a compound angle the appliance illustrated has been developed and is being marketed by the Carling Tool & Machine Co., Hartford, Conn.

The device is designed to set work to a compound angle through the medium of simple angles determined and measured by the simple sine bar. Angles up to 46 deg. can be set precisely by the use of size blocks applied and computed in the same manner as a simple sine bar. Its pivot shafts are at exactly 90 deg. to each other and permit inclination of the table in a forward and sideways direction up to the maximum angle capacity. From this feature it might be called a two-way sine bar. The edges, table top and base seat are accurately aligned with the pivot shafts, permitting of quick, accurate set-ups on a grinder table.

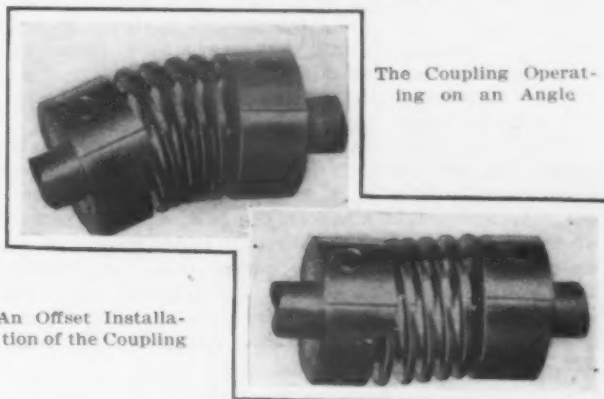
In setting to an angle size blocks are selected, placed on the desired gage point and the pivot shaft bound. The binding action will be against the size

blocks and supporting walls so that the setting will not be disturbed in clamping. The clearances cut in the base have kept the height in a level position to a minimum, well within the range of small surface grinders.

The size available at present has a 5 in. by 5 in. table 3½ in. high when level, 46 deg. capacity of inclination and 2 in. center distances of sine plugs. Special sizes can be developed if required. The square table is said to be the most efficient design, as it keeps the height to a minimum, reduces overhang of the table and presents the least interference when handling on a machine.

All-Steel Flexible Coupling for Light Duty

All-steel cut spring flexible couplings, as shown in the illustration, for shafts up to 1 in. in diameter have been placed on the market by the Steel-Flex Coupling Corporation, Detroit. They are intended for use in



The Coupling Operating on an Angle

An Offset Installation of the Coupling

connecting light-duty motors directly to small drill presses, blowers, fans and other machinery where shafts are slightly out of line, and where it is desired that the coupling act to reduce friction in shaft bearings and act to absorb shocks incident to sudden starts.

One of the illustrations shows the coupling operating at an angle, the other illustration being of an installation where there is considerable offset. It is always desirable, however, to have the shafts as nearly in line as possible. The couplings are formed from a cylindrical tube of steel said to be especially suitable for power transmission purposes. Safety set screws are used for securing the couplings to the shaft.

A standard line of coil spring flexible couplings for shafts 1 to 12 in. in diameter and having helical driving coils formed of rectangular chrome-vanadium steel bars, tempered to provide high elasticity, are also offered by the company. In the couplings the coils are mounted, one within the other, on machine steel plugs and on the end of the coils are shrunk steel headers intended to bind these parts into a continuous flexible unit. Flanges are attached by means of safety cap screws.

Gear Association Quartered at Cleveland with Permanent Secretary

The American Gear Manufacturers' Association moved its headquarters from Philadelphia to Cleveland last week and is now located at 2443 Prospect Ave., S. E., in that city. F. D. Hamlin, who has been secretary of the association since its organization, has resigned, and T. W. Owen, who has been associated with the Johns-Manville Co. in its Cleveland office for ten years, has been named acting secretary. With the growth of the organization, the secretarial work has increased to the extent that it requires all the time of the secretary, and Mr. Owen will devote his entire attention to the association activities.

F. W. Sinram, president, VanDorn & Dutton Co., Cleveland, has been president of the association since it was founded in 1917. The semi-annual meeting of the association will be held in Chicago, Oct. 9, 10 and 11.

CO-OPERATIVE DEALING

Plan of Youngstown Sheet & Tube Co. Proves Successful—Growing in Popularity

In line with the theory of President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio, that to be successful a company must have contented employees, the company has established a co-operative system which is proving successful. It began three years ago in a small way and has now become an important part of the good work being accomplished under the plan of Employee Representation in effect at the company's plants. The amount of sales in June, 1922, was in excess of \$33,000, and it is claimed that the prices charged were, on an average, twenty per cent under retail prices.

The system was established at the request of the committee on housing and domestic economics, and was in response to the urgent desire of the men in the mills, who complained that they were forced to pay excessive prices for the goods bought by them in local stores. They complained that every time wages advanced, and before the advance became effective, there was an increase in the cost of living, prices of meats, groceries and other supplies being raised.

"Knowing of the failure of many co-operative movements, the management hesitated to start a co-operative store," states W. C. Reilly, general superintendent. "It recognized, however, the justice of the request of the men and after a thorough investigation of co-operative stores in other localities, it was decided by the joint committee on housing and domestic economics to start simply a co-operative buying system, and gradually expand it as experience and patronage justified."

Business Expands

In the opinion of officials, the experiment has proved successful. The business has expanded and a greater variety of commodities is carried, embracing groceries, canned goods, shoes for men, clothing and other supplies required by men in the mills. Seasonable goods are also purchased when they can be distributed at a saving. It is pointed out that only first-class goods are accepted, and care is exercised in the quantities purchased so as not to secure an over-supply. The company furnished the capital for the enterprise and provided a place for the store, but caution is necessary in making purchases because the fluctuations of wholesale prices might at any time leave on hand a stock of goods that could not be disposed of without loss.

In May of this year the business had increased to such an extent that the company recommended abandonment of the stores within the plant and the establishment of a main distributing station, with several branches, for the convenience of the workmen. This was accordingly done and a central store was created at Struthers, near the main plant. All goods are received at the Struthers store and all orders to be delivered to customers are distributed from this store. A stock of goods is carried in both the East Youngstown and South Gate auxiliary stores, but no deliveries are made from these points. They are simply for the convenience of the men going and coming from the plant, or the families of workmen living in the vicinity.

Selling at Wholesale

"The purpose is to sell supplies of all kinds to workmen and their families at wholesale cost and the actual cost of handling," says Mr. Reilly. "The company does not realize any return on the capital invested and makes no charge for the space occupied by the stores. It will be well satisfied if the other necessary expenses are met. Up to this time it has been impossible to avoid some loss, owing to the expense of fitting up the stores, but it is believed that increased business will take care of the expenses from this time forward, without any increase in the small margin at which goods are sold."

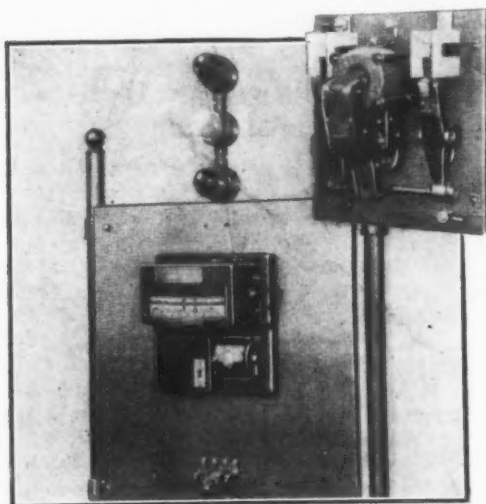
Keeps Down Prices

"The co-operative buying system has not only saved considerable money to patrons of the stores, but the principal benefit from it has been its tendency to keep local retail prices down to a reasonable level, a benefit shared by the entire community," Mr. Reilly points out. "The company is not particularly interested in the amount of business done in the stores, since it makes no profit from them; and it recognizes that the volume of business they do is not the full measure of their success, for the reason that while the patrons of the stores make a direct saving on all of their purchases there, they and other employees who do not patronize the stores are saved considerable money on account of the regulating influence the prices charged at these stores have on the prices charged by other dealers."

"In effecting the object for which it was established, distributing goods at cost to the patrons, and regulating the retail prices in this vicinity, we have not made the mistakes which have wrecked so many co-operative movements and believe the plan will continue to be a success."

Automatic Temperature Regulator

The Hoskins Mfg. Co., Detroit, has placed on the market the temperature regulating apparatus shown



Temperature Regulating Equipment for Electric, Oil and Gas Furnaces

in the accompanying illustration. It is known as type R E and is designed to indicate and control the temperature of oil, gas, or electric furnaces of any type.

The control mechanism operates every 30 sec. and permits a temperature variation of the thermo-couple of plus or minus 10 deg. Fahr. When used on electric furnaces, the instrument operates a small relay, which in turn actuates the main power switch, which is of the magnetic type.

When the furnace is operating at the desired temperature, within 8 deg. Fahr., a white signal lamp is lighted. If the temperature goes above or below this limit the heat is shut off or put on, a red or green light appearing respectively. The control mechanism is operated by a small motor.

The illustration shows the complete equipment for electric furnace control, although the instrument can be furnished without the other apparatus if required.

Effective Sept 1, an increase of approximately 30 per cent in wages has been announced by the Harbison-Walker Refractories Co., the General Refractories Co. and the United States Refractories Co. Common labor now receives \$3.50 per day as compared with the former rate of \$2.70, and wages of skilled working men have been advanced in proportion.

COMBUSTIBILITY OF COKE*

A Laboratory Method for Its Determination— Hardness Test

BY WILLIAM A. HAVEN

THE experiments herein described originated in an attempt to confirm by a laboratory test an apparently considerable difference in the combustibility of two kinds of by-product coke used at the Haselton furnaces, one from a coal mixture containing 85 per cent Klondike, the other from a mixture containing 85 per cent Upper Freeport coal.

The results obtained did not confirm our interpreta-



The Tumbling Drum Used for Hardness Testing of Coke

tion of the furnace practice in this particular case but in the course of the laboratory work we secured some satisfactory comparisons between the burning curves of charcoal, coke and the dense carbonaceous deposit found on the walls of by-product ovens. We were also able to verify the pronounced effect upon

through a 3-in. screen onto a 1-in. screen. Ten kilograms of the portion which stays on the 1-in. screen is placed in a steel drum for the Barrett tumbling test. The drum is rotated at a speed of 24 r.p.m. for a period of one hour. The sample is then taken out and passed through a $\frac{1}{4}$ -in. screen. The weight of the coke remaining on the $\frac{1}{4}$ -in. screen, expressed in percentage of the total sample put in the drum, is taken as the hardness factor.

Discarding the coke from the drum which passes through the $\frac{1}{4}$ -in. screen, the remainder is quartered down to a $\frac{1}{2}$ -kg. sample, the entire amount of which is crushed to pass through a $\frac{1}{4}$ -in. screen and that portion of it which remains on the $\frac{1}{4}$ -in. screen is used for the combustion test.

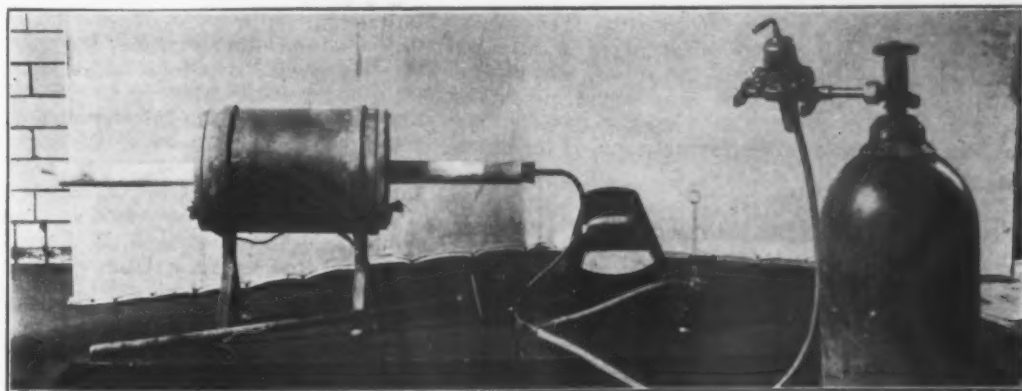
The furnace used in the test is made of $\frac{1}{4}$ -in. steel pipe, 12 in. long and 8 in. in diameter. In the center of the pipe is a hollow asbestos core around which is wrapped about 90 grams of from 19 to 22 gage wire. The core is packed in the pipe with asbestos and through it is inserted a silica tube, $1\frac{1}{2}$ in. in diameter and 31 in. long. Oxygen is led into the furnace through a rubber stopper and the discharge end is packed with asbestos through which there is a small glass tube for the escaping gases.

A 1 gram sample of coke, sized as described above, is weighed in a platinum boat, $\frac{1}{8}$ -in. wide, $\frac{1}{2}$ -in. deep and $3\frac{1}{2}$ in. long. The temperature of the furnace is brought to a constant at about 1800 deg. Fahr. The boat is placed in the furnace and the sample burned for one minute in an excess of oxygen which is assured by maintaining a pressure of 2 in. of mercury. It is then removed and weighed to determine the loss of carbon. In the same manner the loss in 2, $2\frac{1}{2}$, and 3 min. is determined, or at $\frac{1}{2}$ min. periods, until the combustible matter is nearly all consumed. The average of these results expressed in centigrams per minute is taken as the burning speed.

The determinations are run in duplicate or until a satisfactory check is secured for each period. In order that results may check closely it is essential to use platinum boats, identical as to size and shape, and to distribute the samples evenly within the boats so that the surface exposed to oxidation shall be as nearly constant as possible. About 45 min. work in the laboratory is required.

Nails Made by Minnesota Steel Co.

The first shipment of wire and nails made in the new plant of the Minnesota Steel Co., Duluth, Minn.,



The Laboratory Apparatus Used in the Combustion Test of Coke

burning speed produced by variations in the size of coke. Our investigations were then extended to other grades of coke produced in the Mahoning Valley and to samples from by-product plants in Southern Ohio and the Chicago districts. We have now added the combustion test to the daily routine laboratory determinations for chemical analysis and hardness.

For the purpose of the test a large sample is secured from not less than five cars. From this a portion is taken, by quartering down, for chemical analysis and the remainder, after being dried for 24 hr., is crushed

was recently made. It consisted of 500 spools of wire and 1000 kegs of nails. For the time being the mill is reducing billets shipped to Duluth by the Illinois Steel Co., but later it will use its own steel. The output of the wire plant is marketed by the American Steel & Wire Co., just as the other products of the Minnesota Steel Co. are sold by the Illinois Steel Co.

Directors of the Crucible Steel Co. of America have offered to both common and preferred stockholders of record Sept. 11 an additional 50,000 shares of common stock at \$100 per share on a pro-rata basis, according to a statement by H. S. Wilkinson, chairman. The object is to provide additional working capital.

*From a paper before the Eastern States Blast Furnace & Coke Oven Association. The author is superintendent Northern Furnaces Republic Iron & Steel Co.

REPLY TO PROTEST

Arrow Company Gives Reasons for Establishing Lower Pig Iron Rate

WASHINGTON, Sept. 12.—Replying to the protest of the Steel & Tube Co. of America, and other Chicago district producers, who have filed a protest with the Interstate Commerce Commission against the plan to establish a joint rail-and-water rate on pig iron from Florence and Sheffield, Ala., to the Ohio River and beyond, the Arrow Transportation Co. has asserted that irreparable damage would be done to it if the commission suspended the tariffs as suggested by the protestants. It is pointed out by the Arrow Transportation Co., which has proposed joint rates with the Chicago, Burlington and Quincy Railroad, that it has already invested \$40,000 for the construction of barges to transport pig iron. The claim is further made that the company had contracted for delivery on Oct. 1 of a steel towboat at a cost of \$120,000 when fully equipped. It is maintained by the company that even brief suspension of the tariffs would make entirely useless the equipment provided for to carry pig iron from Florence and Sheffield to Metropolis, Ill., for shipment beyond by the Burlington Railroad. The Arrow company makes an emphatic denial of the claim that its tariff is detrimental to the carriers' interest. It is contended that the commercial conditions involved simply are the desire of the Southern furnaces to take advantage of the rail and water transportation.

The through rate published in the Arrow tariff is made up of the \$1.96 local rate of the boat line from Florence and Sheffield to Metropolis and the \$2.22 division going to the Burlington Railroad on pig iron, brought to Metropolis by a railroad south of the Ohio River.

The Arrow company says that it serves only the furnaces at Florence and Sheffield, "the production of which is insignificant in amount, compared to the production at Birmingham. The figures are 2,500,000 tons per year at Birmingham as compared with 150,000 tons at Florence and Sheffield."

Fire Damages Inland Plant

CHICAGO, Sept. 11.—Fire of unknown origin broke out in the coal mixer serving the coke ovens of the Inland Steel Co. plant, Indiana Harbor, Ind., Sept. 7. Damage to machinery and equipment is estimated at \$60,000. A most serious result of the conflagration is its interference with coking operations. Temporary arrangements are being made to take care of the mixing and conveying of coal for the ovens, but in the meantime operations have been interrupted in certain units of the plant dependent on coke oven gas, such as the annealing and galvanizing departments in the sheet mills.

Railroad Cars Ordered or Under Construction

WASHINGTON, Sept. 12.—For the seven months from Jan. 1 to Aug. 1 of this year, railroads of the United States had 25,763 more new cars, either ordered and under construction or installed in actual service than during the entire year of 1921, according to reports carriers have just made to the car service division of the American Railway Association. The railroads had installed or had on order 95,199 freight cars of various kinds during the seven months ending on Aug. 1, 1922, while for the year 1921 a total of 69,436 were ordered or installed in service. Of the total ordered or already installed, 41,405 were coal cars. Orders calling for the delivery of 29,175 coal cars were in the hands of car manufacturers on Aug. 1 last, and delivery of these cars is under way daily. Up to Aug. 1 of this year 12,230 new coal cars had actually been installed and during 1921, new coal cars either placed in service or ordered totaled 30,698.

There were also 39,612 box cars, either installed or on order during the first seven months of this year.

The reports showed that orders for 31,610 cars existed on Aug. 1 last, while 8002 had actually been delivered and placed in service this year up to that time, while 21,543 new box cars were ordered and actually placed in service in 1921. The carriers also are augmenting their supply of refrigerator cars as is shown by the fact that on Aug. 1 orders had been placed for 6428. During the seven-month period, 3870 had actually been installed and placed in service, making a total of 10,318 installed or on order. During 1921 the number of refrigerator cars ordered or installed totaled 9355, exclusive of new refrigerator cars purchased by private companies.

Coal Companies Merged

PITTSBURGH, Sept. 11.—Details were made public last week by J. H. Sanford, vice-president Carnegie Coal Co., Pittsburgh, of a merger of several bituminous coal companies in the Pittsburgh and western Pennsylvania districts. The new company, now in process of formation, based on 1920 production figures, will have a normal annual output of 8,000,000 tons, and this may be increased by the inclusion of other producers to a total of 9,500,000.

The companies to enter the combination and the production of each for 1920 are: John A. Bell interests, 2,000,000 tons; Carnegie Coal Co., 1,350,000 tons; Verner Coal & Coke Co., 345,000 tons; Burgettstown Coal Co., 255,000 tons; Henderson Coal Co., 325,000 tons; Chartiers Creek Coal Co., 270,000 tons; McClane Mining Co., 475,000 tons; Meadowlands Coal Co., 500,000 tons; Pittsburgh & Eastern Coal Co., 240,000 tons; Pittsburgh & Erie Coal Co., 430,000 tons, and the western Pennsylvania mines Youghiogheny & Ohio Coal Co., 1,120,000 tons.

Pittsburgh Plus Case Hearing

WASHINGTON, Sept. 12.—Plans for resuming hearings in the Pittsburgh base case not having been completed, the date of Sept. 11, when representatives of the Federal Trade Commission had proposed to start taking additional testimony, has been abandoned. It is expected to set a definite date and place within a few days.

Interstate Commerce Decisions

WASHINGTON, Sept. 11.—The petition of the Northern Pacific Railway Co., on behalf of the Minnesota & International Railway Co., Big Fork & International Railway Co., and other carriers, for authority to continue the charge on structural steel and machinery from Duluth, St. Paul, Minneapolis and Minnesota transfer and Superior, Wis., to International Falls, Minn., without observing provisions of the fourth section of the interstate commerce act was denied to-day by the Interstate Commerce Commission.

The commission also issued an order to defer operation of schedules filed by F. W. Gomph relating to iron and steel articles from Utah common points to California points. The order defers the operation of schedules specified until Oct. 23.

Wages Advanced

The Walworth Mfg. Co., Kewanee, Ill., has advanced common labor from 30c. to 36c. an hour, following similar action by Chicago district subsidiaries of the United States Steel Corporation.

The Gifford-Wood Co., Hudson, N. Y., manufacturer of conveying, handling and elevating machinery, has purchased the property at Hulton, Pa., on the Alleghany River, formerly occupied by the Crescent Forging Co., and lately by the Mendel Box Co. Work of remodeling the buildings has been started. Officers of the company are William B. Wood, president; Benjamin Gifford, vice-president, and W. T. Wood, secretary-treasurer.

American Chemists Hold General Conference on Metric System

PITTSBURGH, Sept. 11.—The sixty-fourth meeting of the American Chemical Society, held here last week at Carnegie Music Hall and in several buildings of the Carnegie Institute of Technology, attracted one of the largest gatherings in the history of the society, registration reaching 1335. A meeting of the councilors was held on Sept. 4, and the business of the convention began with general meetings on Tuesday, Sept. 5. Wednesday and Thursday were given over to divisional meetings, while Friday and Saturday were devoted to excursions. That on Friday was a general one and took in a visit to the by-product plant and steel works, Carnegie Steel Co., Clairton, Pa., and to the Monongahela City, Pa., works, American Window Glass Co. Saturday the visitors were given a selection of places to go to and excursions were by groups.

A conference on world metric standardization held, Sept. 6, with Prof. Eugene C. Bingham, Lafayette College, Easton, Pa., chairman, brought together by invitation representatives of practically every scientific society in this country. The general topic was "Aid to World Metric Standardization," and a resolution was adopted favoring a gradual rather than a sudden adoption of the metric system. The United States Department of Education and other educational agencies will be asked to broaden the teaching of this system in the schools. Early discussion disclosed that several manufacturing companies were opposed to the adoption of the system owing to the expense involved by the change. Another resolution adopted by a narrow margin urged the adoption of the double marking system on merchandise, one marking to be under the metric system and the other under the present English system.

British Institute of Metals New Series of Lectures

A notable feature of the forthcoming Swansea meeting of the Institute of Metals will be the inauguration of a series of annual public lectures on "Subjects of Practical Interest to Those Engaged in the Non-Ferrous Metals Industry." The lectures are additional to the annual May lectures of the Institute of Metals, which have constituted a feature of the institute's work since 1910. Dr. R. S. Hutton, a member of council of the institute, and director of the British Non-Ferrous Metals Research Association, is to deliver the first of the new lectures, entitled "The Science of Human Effort (Motion Study and Vocational Training)". The lecture will be delivered at 8 p. m. on Tuesday, Sept. 19, at the Y. M. C. A., Swansea. The subsequent proceedings at Swansea include the discussion of 15 papers on various metallurgical subjects, civic and other receptions and entertainments, visits to works and a motor tour round the Gower Peninsula, the meeting lasting from Sept. 19 to Sept. 22.

Cost Accountants to Meet

Topics to be discussed by the National Association of Cost Accountants at their third international cost conference at Atlantic City, N. J., Sept. 23 to 28, include the following:

Actual costs as compared with Replacement Costs; Sales and Administrative Costs; Standards as a Means of Reducing Costs; Budgets—Their Construction and Use; the Place of Costs in Business Management; Cost Problems of the Textile Industry.

Among those who will participate are Ambrose Downs and N. D. Farmer, Carborundum Co., Niagara Falls, N. Y.; R. H. Gregory, Western Electric Co., New York; S. C. Allyn, National Cash Register Co., Dayton, Ohio; Irving Berndt, consulting industrial engineer, New York; R. W. Darnell, Ritter Dental Mfg. Co., Rochester, N. Y.; John M. Scanlon, Hess-Bright Mfg. Co., Philadelphia; S. L. Whitestone, General Electric Co., Schenectady, N. Y.; C. M. Finney, Worthington Pump & Machinery Corporation, New York; C. E. Patterson, vice-president, General Electric Co., New York.

Under the topic "The Place of Costs in Business Management" will be covered in a practical way, the broad question of the relationship which ought to exist between the cost department and the other departments and the general management. This should be of particular interest not only to cost men, but, also, to managing executives who are interested in getting full value out of their cost departments.

Motion Pictures in Industry

On Thursday afternoon, Sept. 14, at 2 o'clock during the week of the National Exposition of Chemical Industries at the Grand Central Palace, New York, several papers are to be presented before members of the Technical Photographic and Microscopical Society, which is to hold a general meeting in the lecture hall at that time.

Among the papers to be presented is one entitled "The Motion Picture as an Aid to Industry" by Dr. Alfred B. Hitchins, director of the Ansco Research Laboratory, Ansco Co., Binghamton, N. Y.

High Grade Steels Neglected

Any improvement there may be in the steel trade of Great Britain, according to the *Engineer*, London, is practically restricted to the basic and cheaper grades. Acid steel is meeting with very little demand and the high-speed and other special steels for engineers' tools will not, of course, be wanted until there is a revival in the engineering industry. The serious competition Sheffield steel makers have of late been experiencing from the Lincolnshire furnaces has, if anything, been intensified, with the result that Sheffield soft billets have been reduced by 5s. to £7 5s., but this is still dearer than similar steel delivered by Lincolnshire makers in Sheffield.

Chileans Want Machinery Catalogs

The American Commercial Attaché at Santiago, Chile, advises the Department of Commerce that although that office receives catalogs from American manufacturers in each mail, it is not collecting them with sufficient rapidity to meet the requests for information which are steadily being received. There is an especially active demand for catalogs of machinery of all kinds, not because of any particular prosperity among Chilean manufacturers, but for the reason that the representation for specialized American machinery is rather lacking in Chile except in certain lines where the makers are represented by their own salesmen or by an unusually alert agency. Many orders for machinery have been placed in Europe simply because of a lack of knowledge of the American product or in default of accessible American catalogs and price lists. It is suggested that catalogs be sent to the American Commercial Attaché at Santiago, Chile, (Casila 27-D, Santiago, Chile), by such American machinery builders as are interested in export trade. At present there is particular interest in wood-working machinery, especially that equipped with electric motor drive.

Equipment for Air Service

SPRINGFIELD, OHIO, Sept. 11. — A conference of McCook field men was held Friday afternoon with General Manager George E. Ireland and experts of the Steel Products Engineering Co. regarding the manufacture of special equipment for the balloon section of the United States Air Service. The company is making a balloon tender, which is to be used in pulling down a captive balloon. It is also turning out a compressor which will be used in refilling balloons in the field. Each will be placed on a four-wheel drive truck chassis. The company is not only making the balloon equipment but it is building special truck axle drive, axles and other parts of the machines. The company has received an order from the Government for 14 crankcases for 18 cylinder engines for the Air Service.

Three New Books on Labor Problems

Immigration, Radicalism and Other Problems Discussed from Varied Viewpoints

REVIEWED BY CHARLES MORRIS MILLS

The Federal Administration and the Alien. By Frances Kellor. Pages xvi + 64. Published by George H. Doran Co., New York. Price, 50 cents.

The Peril of the Republic. By David Chauncey

Brewer. Pages vi + 354. Published by G. P. Putnam's Sons, New York. Price, \$1.75.

Industrial Unionism in America. By Marion Dutton Savage, Ph.D. Pages v + 344. Published by the Ronald Press, New York. Price, \$2.25.

FRANCES KELLOR is pre-eminently fitted through training, experience and position to deal constructively with the immigration problem. Her little book, "The Federal Administration and the Alien," is a supplement to her larger work, "Immigration and the Future," published in January, 1921. Up to the present time our governmental policy toward the alien has been to guide him toward the point of entry or rejection. The three per cent restriction law has sought a numerical solution. Miss Kellor, writing just previous to the final passage of the three per cent law, does not touch on the regulation of the amount of immigration, but with the even larger question of the policy of the present Federal Administration, particularly from an international point of view.

Restrictive immigration measures, passed in a time of supposed emergency, do not reach many fundamental problems. The reorganization of our Federal immigration service; the development of domestic markets by using aliens as salesmen for foreign goods and of foreign markets by returning aliens; the safeguarding of immigrant savings; the stimulation of the investment of such savings in this country; the protection of the alien temporarily residing in this country; the training toward citizenship of the alien permanently remaining; and the promotion of international good-will through the immigrant are among some of the more pressing questions not included in regulatory methods.

As Miss Kellor lucidly points out, "the Government should not lose sight of the immediate program, which is to restore Ellis Island to a basis of pre-war efficiency; to enforce and recodify the existing immigration law; to rearrange Federal immigration duties so as to avoid overlapping; to stabilize immigration through the De-

partment of Commerce to capitalize the immigrant's resources through the Treasury Department; to protect aliens; to overhaul the antiquated naturalization service, and to institute an inquiry which will provide a permanent substitute for emergency measures." In many States unjust discriminatory laws break down the alien's respect for law, and he retires to the racial colony for protection—to become an unassimilated element in our population. The relationship of Federal officials and racial leaders built up during the war should be continued, for "if there is any one subject upon which the foreign born voter can help the country it is immigration," and "it is his point of view and personal interest that needs to be joined to those of the native born to secure an all-around policy which will fully represent American interests."

In international relationships the immigration problem has reached an added importance through the creation of the Emigration Commission of the International Labor Office of the League of Nations; in the development of the control of emigration from certain countries; and in the competition of more sparsely settled countries for immigration. If we are to deal intelligently with the alien as an international human being, we should construct as sound a policy as on international finance or commerce.

Many industrial leaders are realizing to-day that the present three per cent law, effective in holding back huge tides of immigrants, is not furnishing us with the type of immigrant necessary to upbuild the nation's resources. The present statute will be revised sooner or later. Miss Kellor's book is of timely importance to those interested in a practical solution of this great problem.

Pessimistic Views as to Aliens

A FRANKLY pessimistic view of the alien situation is pictured by Mr. Brewer in "The Peril of the Republic." The sub-title, "Are We Facing Revolution in the United States?" is sufficiently indicative of the general outline of the book, which "is written with the sole purpose of pointing out that the alien invasion has quickened the drift to political revolution." Unquestionably the vast changes in our nation during the last 100 years in homogeneity, environment, and general personnel have transformed our democracy far from its original basis, but surely the individualistic conceptions of the founders of the Republic cannot be applied in entirety to the problems of the heterogeneous nation of 110,000,000 people to-day. Nor has the change in the form of government been confined to America—the foremost nations during the same period have moved from individualistic laissez-faire monarchies to social democracies. The great task and contribution which American democracy can make lies in applying the pith and substance of our Constitution to our great social and industrial problems. Our profound confidence in the Republic is justified in the very sureness of the triumph of American democracy in adjustment and solution during the course of the twentieth century.

Therefore, most of us will find it difficult to agree with the alarmist point of view of Mr. Brewer in

feeling that we are on the brink of a social and industrial revolution which may be directly traced to the alien invasion of the last 30 years. All of us recognize the vast difference in political antecedents, language, and racial characteristics of the more recent type of immigrant with those of America. Undoubtedly a small minority of these newcomers are professedly dangerous radicals with extreme views, but the great, vast majority of these people are industrious, sober workers. It is difficult to believe that "the Government of the United States as at present administered cannot live"—principally (as the author says) because it does not adequately protect itself against the machinations of communistic groups and extremely socialistic propagandists sufficiently large and powerful enough to threaten the life of the Republic. The thorough patriotism of the thousands of foreign born and first generation Americans who served faithfully through the Great War is sufficient refutation for such extreme views.

Certain portions of the book dealing with the exploitation of the immigrant, naturalization and Americanization are more mild and somewhat constructive, but in naming perverse education as one of the causes of the downfall of democracy, the author actually questions the worth of our educational system. At least,

"the founders of the Republic recognized the value of education for those who could use it advantageously, but they did not attempt to provide more of this education, even for those whose faculties fitted them to absorb it, than was commensurate with the safety of the Republic. Mr. Brewer then suggests that moral training and suitable environment be substituted for years misspent in the classroom under socialistically inclined teachers supported by huge taxes. Just how our "extravagant and artificial school system" is to be reconstructed is not explained!

Summing up, we must "hold fast to whatever rights and privileges we still retain—by calling back to private

life the army of office holders who form a large percentage of the population, using the schools to teach democracy instead of sociology, regulating the alien population, and providing a censorship for the non-English press—in short, by doing the obvious things to block revolution, whether it comes by fire or sword, or possibly by the art of the adroit autocrat." Surely such words may bring great comfort to the heart of the reactionary who thinks the country is on the verge of the bow-wows, but for the middle-of-the-way citizen, interested in an open-minded discussion of the alien problem, there is little of fact or fancy in "The Peril of the Republic."

Different Kinds of Labor Unions

FOR some time there has been a widespread demand for reliable and impartial information regarding the development of the newer type of American labor union organized around a complete industry, in contrast with the "old-line" unions organized by crafts or trades. Dr. Savage's "Industrial Unionism in America" is an able presentation of the facts and factors in the growth of industrial unionism. It makes no attempt to discuss the right of labor organization, but deals with an analysis of the various types of industrial unions. The chief difference between the old and new unionism lies, not in the structure, but in the spirit and philosophy of industrial unionism. In the main, the industrial union is based on the idea of the solidarity of labor, laying stress on the mutual dependence of both skilled and unskilled workers in their struggle against the capitalist system, and the majority of industrial unions "are distinctly hoping for the abolition of the capitalist system and the ultimate control of industry by the workers themselves."

The book is divided into three sections: the first deals with industrial unions within the ranks of the American Federation of Labor, such as the United Brewery Workers, United Mine Workers and Mine, Mill and Smelter Workers; the second discusses radical industrial unions, including the workers of all industries, such as the I. W. W. and the One Big Union; and the third with independent industrial unions, such as the Amalgamated Clothing Workers, Needle Trade Workers' Alliance, United Textile Workers, Amalgamated Textile Workers and numerous small unions.

Many matters of considerable momentary importance are ably discussed. The struggle between the conservative and the radical elements for the control of the policy of the United Mine Workers; the effect of prohibition upon the United Brewery Workers; the historical development of the Western Federation of Miners; the unrelenting non-co-operative policy of the I. W. W., and the educational and co-operative program of the Amalgamated Clothing Workers are interesting sidelights on the present industrial crisis.

In the conclusion, the author touches upon the psychological and social influence of industrial unionism, particularly the effect of their radical philosophy on the expansion of craft unionism. The main tenet of industrial unionism is class consciousness. Is the latter an unmitigated evil? Would the control of industry by workers be more efficient? Why is the general attitude of industrial unions toward present collective agreements restrictive? Are industrial unions more democratic than craft unions? Is there any social idealism connected with radical industrial unionism? These are some of the questions which the author discusses at the end of his analysis, leaving final judgment with the reader.

For the industrial executive and the student of our industrial relations problems, this analysis of some of the most important elements in the labor movement to-day should be of considerable value, although the antipathy of more conservative readers may be aroused by the discussion of the various doctrines of radical unionism.

Causes and Prevention of Accidents in the Iron and Steel Industry

In a 400-page volume, the United States Bureau of Labor Statistics has gathered data and made a comprehensive analysis of the accidents during the 10 years, 1910 to 1919, in the iron and steel plants of the United States. This has been published as bulletin No. 298. It consists very largely of tabular matter grouped according to the kind of plant and further grouped under several combinations according to the character of the accident cause, the character of the damage inflicted, and further with regard to the severity of the accident—whether fatal or causing permanent or temporary disability. In the latter case, the average duration of the disability forms another classification.

Blast furnaces, Bessemer and open-hearth plants, foundries, heavy rolling mills, plate mills, tube mills, sheet mills, fabricating, electrical and mechanical departments and yards form the different classifications according to the kind of plant, to which should be added one unclassified heading. The accident cause is grouped under the several headings of machinery, steam apparatus and power vehicles, hot substances (including both molten metals and other materials) fall of the worker, falling objects, handling tools and other objects and unclassified.

Numerous diagrams illustrate the text and bring out more clearly than figures the subjects of accident

frequency, severity, etc. A number of half-tone illustrations, showing situations under which accidents occur and safeguards against their occurrence, illustrate the text.

In a 32-page pamphlet, "The Finances of Disarmament," the Mechanics & Metals National Bank, New York, traces the work of the late Washington conference on the limitation of armament and presents figures to show the ultimate financial saving to the principal nations involved. For the United States, Great Britain and Japan these savings, based on probable naval costs in 1928, are placed at \$270,000,000, \$260,000,000 and \$250,000,000, respectively, per year. Based on completion in 1924 of known naval programs, these annual savings are placed at \$90,000,000 less, for each country, than for 1928. Even this, however, results in an aggregate saving, for the three powers, of \$510,000,000 annually.

The Arcade Malleable Iron Co., Worcester, Mass., is operating its third 20-ton reverberatory furnace in a newly constructed plant unit, which gives employment to 30 additional molders. The company's present 60-ton furnace capacity compares with 38 tons a year ago. The plant is operating five days a week and has sufficient business on its books to continue on that basis the balance of 1922 at least.

FOREIGN CONDITIONS

Observations of W. P. Snyder, Jr., During Two Months in Europe

Impressed greatly by the energy and application of foreign workmen, W. P. Snyder, Jr., president She-nango Furnace Co., Pittsburgh, who has just returned from a two months' trip to Europe, fears that the foreign trade of the United States will suffer, unless American workmen develop some of that spirit of willingness to work, which is the prevailing characteristic of workmen abroad. This becomes essential in view of the recent wage increase in the iron and steel industry, Mr. Snyder says, for not only did he find foreign workmen laboring faithfully, but putting in long hours and in most countries at very low wages.

In France, common labor was being paid 15 to 20 francs per day, equal, at the rate of exchange when Mr. Snyder was in that country, to only about \$1.50 in American money and for that rate the men were working 12 to 14 hours daily. In the war ravished areas in that country, remarkable industry was being shown in reconstructing homes and an interesting feature of this work to Mr. Snyder was the use of steel to support the exteriors of stone. In England, wage scales are more comparable to those in this country,

but employers had the situation well in hand and there were no signs of trouble.

In Germany, however, working conditions were almost chaotic, due chiefly to the frequent fluctuations in the value of the mark. The 8-hour day is generally established, and not only does production suffer from that fact, but also because of the frequent interruptions occasioned by the changing value of the money unit of the country. The men apparently keep well informed on the mark value and when it declines, they make instant demands for increases. One day the rate of pay for common labor in such establishments as Krupps was 35 marks per hour, but the next day it was 50 marks because of a drop in the exchange value. Marks sold as low as 1400 for \$1 during Mr. Snyder's visit, but generally are rated at 1000 to the \$1. At the latter rate, German laborers are receiving the equivalent of 5c. per hour in American money, or 40c. per day of eight hours.

Mr. Snyder commented upon the absence of new automobiles in either England or on the continent, saying that most of the cars he saw were models of five to seven years ago. So many American-made trucks remained overseas at the conclusion of the war that everywhere, especially in France, practically no other makes are seen. These trucks were disposed of at very low prices and much below what foreign trucks could be produced for, even to-day.

GERMAN STEEL INDUSTRY

Production Data for 1920 and 1921—Exports and Imports for June, This Year

Based on data published in two German journals, the National Federation of (British) Iron and Steel Manufacturers makes public the German pig iron and steel production for 1919 and 1920. So far as known this is the first information regarding the activity within German industry in those two years. Compared with pre-war years the data are as follows in gross tons per month:

	Pig Iron	Steel
1912.....	1,279,200	1,339,600
1913.....	1,373,000	1,445,000
1920.....	464,000	552,000
1921.....	508,000	725,000

These figures do not include Luxemburg.

Data have also recently appeared in *Stahl und Eisen* covering the exports and imports for June, which were 213,220 tons and 215,022 tons respectively. Compared with pre-war data, the movement this year and in 1920 and 1921 is as follows in tons per month:

	Exports	Imports
1912	482,400	27,300
1913	516,900	25,000
1920	143,600	26,200
1921 (8 months).....	203,600	.....
1922 (6 months).....	205,700	151,800

The chief items in German exports in the last two months of this year (May and June), have been rails, shapes and plates. The chief countries of destination have been, besides Holland, the Argentine, Sweden, Japan, United Kingdom, British India. The large imports are made up of a considerable influx of scrap iron and steel.

National Steel Lumber Sections

In a little cloth bound volume measuring 4 x 6½ in. and carrying more than 180 pages, the National Pressed Steel Co., Massillon, Ohio, has put out a handbook of steel lumber of the same general scope as the familiar handbooks of structural steel sections issued by the various manufacturers of those sections. The book is full of information regarding the use of the light sections covered under the general heading of steel lumber, as used both separately and in conjunction with the heavier rolled steel shapes long familiar in building construction. Numerous diagrams show the method of handling the steel lumber, while tables of strength, safe loads, deflection, etc., give the same sort of in-

formation as obtains elsewhere with regard to the heavier sections.

This subject has become one of increasing importance in the past few years, owing to a deepening realization on the part of forward looking observers of the ultimate and rapid exhaustion of our most available timber supplies, together with the desirability of having a building material of greater permanence than wood. A paper before the American Iron and Steel Institute last year dealt with this subject in some detail. Another paper heading this issue of THE IRON AGE covers the same subject from a somewhat different angle. Still a third contribution to this subject appeared on page 469 of THE IRON AGE for Aug. 24.

It is evident, therefore, that a handbook permitting the architect and engineer to specify intelligently the light sections required for buildings of different character and with differing floor loads should be of great interest to the building profession.

Formal Report to Senate on Proposed Steel Merger

WASHINGTON, Sept. 12.—Acting Chairman Victor Murdock of the Federal Trade Commission last Thursday made a formal report to the Senate, in response to a resolution of Senator LaFollette of Wisconsin, advising that the commission had issued a complaint against the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co., and the Inland Steel Co., in connection with their proposed merger. The report carries the usual statement that the complaint is merely the institution of formal proceedings to test the legality of the merger. It is stated that at the conclusion of testimony and after argument, the commission will determine the facts and apply the law thereto.

"And only if such a conclusion is justified by the facts will an order to cease and desist from the proposed merger be issued," says the report. "Otherwise the complaint will be dismissed. In other words, in the issue of the complaint the Federal Trade Commission expresses no final judgment as to the legality of the proposed merger. If an order to cease and desist from the proposed merger is issued, it is, of course, subject to review by the United States Circuit Court of Appeals."

The Cleveland-Cliffs Co. has announced that it will resume operations at its iron and chemical plant at Gladstone, Mich., on full production by Oct. 15. With this stack in blast all charcoal furnaces in Michigan are again in production, a condition that has not obtained since 1920.

Machinery Markets and News of the Works

FURTHER PRICE ADVANCES

Some Milling Machine Manufacturers Raise Quotations 10 to 12½ Per Cent

Not a Large Volume of Business Is Being Done, But Considerable Is on the Point of Closing

The practical certainty that machine-tool prices will be generally advanced, coupled with announcements of price advances already made, is responsible largely for the volume of tool business now being placed, which, though not large, continues to show an improvement over the first half of the year.

At least two or three of the principal manufacturers of milling machines have sent out notices of price advances averaging 10 to 12½ per cent. A manufacturer of screw machines has adjusted prices slightly upward. One line of shapers has been advanced 20 per cent and a line of boring machines 10 per cent.

Considerable business is at the point of closing, but it cannot be said that a marked turn for the better has

come yet. Much is expected from the railroads, but such business is materializing very slowly. The Chicago, Burlington & Quincy will buy against its recent lists soon and the Chicago, Rock Island & Pacific has shown renewed interest in some items on a list it put out months ago. The Atchison, Topeka & Santa Fe has purchased two milling machines and still has one or two machines to buy. There have been other purchases of individual machines by other roads, including a 90-in. driving wheel lathe by the Boston & Albany.

The Studebaker Corporation, South Bend, Ind., has practically completed buying for its No. 2 plant, but has begun construction of an addition to its No. 1 plant. The International Harvester Co. continues to place orders for its tractor plant in Chicago. The Universal Portland Cement Co. has bought about \$7,000 worth of tools for its plant at Buffington, Ind. A new Cleveland plant has acquired 11 manufacturing lathes.

Steel mill equipment is being purchased by the Otis Steel Co. for additions to its works at Cleveland and the National Enameling & Stamping Co. is about to buy for sheet mills at Granite City, Ill. The Weirton Steel Co., Weirton, W. Va., has bought rolling mill equipment.

New York

NEW YORK, Sept. 11.

BUYING in this district is almost entirely confined to single tool purchases. Some lists from railroads, which buy here, are anticipated, in view of the activity in railroad buying in other parts of the country. Used tool dealers continue to report business good, but many of the sales are not in this territory. One used tool dealer in New York reports sold the past week a 48-in. and a 60-in. lathe and two grinders. The two grinders were the only part of these sales purchased here, the two lathes being for shipment to the Middle West. Within the next 10 days or two weeks an advance in price is expected on milling machines. Railroads which have recently purchased tools outside of New York include the Union Pacific, one radial drill, two wheel presses, one 42-in. lathe and one boring mill; Boston & Albany Railroad, one driving wheel lathe; Oregon & Washington Railroad & Navigation Co., one side head milling machine and one 30-in. planer; Los Angeles & Salt Lake City Railroad, two wheel presses, one radial drill and one car wheel drill. The Illinois Central Railroad will close on a list of between 10 and 12 tools. The General Electric Co. still has some tools pending.

Extreme dullness has characterized the crane market here in the past week. The only new inquiry of size that has appeared is a preliminary request for prices on furnishing two 150-ton overhead traveling cranes, issued by Thomas E. Murray, 55 Duane Street, New York, for the Brooklyn Edison Co., Brooklyn, N. Y. Specifications on the 60-ton, 71-ft. span, 4-motor electric traveling crane for the Phoenix Utility Co., 71 Broadway, New York, have been devised. The tender of the Board of Harbor Commissioners, Wilmington, Del., bids on which were opened Sept. 8, resulted in a low bid of \$61,000 submitted by the Brown Hoisting Machinery Co., for furnishing the three 20-ton locomotive cranes and two 2½-ton portal cranes. The Orten & Steinbrenner Co. was the low bidder on the three locomotive cranes, but did not quote on furnishing the two portal cranes. Other bidders

were the Browning Co., Heyl & Patterson, Dravo Contracting Co., Wellman-Seaver-Morgan Co. and the Lakeside Bridge & Steel Co. Bids are being received by the Board of Harbor Commissioners until Sept. 16 from dealers in used equipment.

Among recent sales are:

Hood Rubber Co., Watertown, Mass., a 7½-ton, 22-ft. 6-in. span electric traveling crane from the Milwaukee Electric Crane & Mfg. Co.

Superior-Portland Cement Co., Concrete, Wash., a 3-cu. yd., 62-ft. 10-in. span grab bucket crane from the Shepard Electric Crane & Hoist Co.

American Car & Foundry Co., New York, eight 2-ton and 3-ton electric hoists from the Shepard Electric Crane & Hoist Co.

Navy Department, Hawaii, three 1-ton and 2-ton capacity cranes, one electric, one motor-driven and one hand power, from the New Jersey Foundry & Machine Co.

New Britain Waterworks, New Britain, Conn., a 5-ton, 33-ft. span hand power crane from the New Jersey Foundry & Machine Co.

Standard Oil Co., 26 Broadway, New York, a 20-ton, hand power crane from an unnamed builder.

P. C. Weil & Son, Bethlehem, Pa., a 10-ton, 40-ft. span, double I beam hand power crane from the Roeper Crane & Hoist Works.

Chester Paper Co., Chester, Pa., a 2-ton, 45-ft. 10-in. electric traveling crane from the Roeper Crane & Hoist Works.

The U. S. Sales Co., manufacturers' representative, 120 Liberty Street, New York, desires to get in touch with manufacturers of rolling machinery, oil burning furnaces and other equipment necessary for rolling angles, flats and other bars from old rails.

The American Brake Shoe & Foundry Co., 30 Church Street, New York, has purchased 17 acres at Portsmouth, Va., as a site for new works. Officials of the company have organized the Ramapo-Ajax Corporation to acquire the plants of the Ramapo Iron Works, Hillburn and Niagara Falls, N. Y., and Niagara Falls, Ont., and the Ajax Forge Co., with plants at Chicago and Superior, Wis. The works will be continued in operation for the manufacture of railroad track material, and improvements will be made. To carry

out the acquisition a bond issue of \$2,250,000 of the subsidiary organization is being sold.

The Staten Island Marble & Tile Works, West New Brighton, S. I., has acquired property, 100 x 140 ft., on Richmond Terrace, as a site for a new plant.

The Baltic Ice Mfg. Co., Inc., 91 Columbia Street, Brooklyn, has plans nearing completion for remodeling the one-story building, 100 x 200 ft., recently acquired, for a new ice-manufacturing plant, estimated to cost about \$50,000. A list of equipment will be arranged at an early date. Max Hirsch, 26 Court Street, is architect. Jacob Swartz is president.

The American Can Co., 120 Broadway, New York, has acquired a six-story factory at 118-24 Pearl Street, Brooklyn, on site 100 x 125 ft., adjoining its present plant, and will equip the building for extensions.

The Imperial Hardware Mfg. Co., 511 Flushing Avenue, Brooklyn, plans the installation of equipment for the production of small U-shaped channels and affiliated specialties.

In connection with the acquisition of the Manufacturers' Tool & Die Forks, 185 Twenty-second Street, Brooklyn, by the Prima Radio Corporation, the merged organization will manufacture a line of animated toys at the Brooklyn works. The wireless equipment branch will provide an average production of 2000 radio tube sets and 3000 crystal sets, monthly. William Schilling is president.

Simon Bruner, 64 Fulton Street, New York, manufacturing jeweler, has leased a floor in the building on the southeast corner of Seventh Avenue and Fourteenth Street, totaling about 10,000 sq. ft., for the establishment of new works.

John Stahl & Son, 4761 White Plains Avenue, New York, will soon take bids for a four-story addition to their automobile service and repair plant, estimated to cost about \$60,000.

The Superintendent of Light Houses, Staten Island, N. Y., will take bids until Sept. 18 for six fuel oil and 14 illuminating oil tanks, as set forth in proposal 13215.

The Alpha Electric Co., 151 West Thirtieth Street, New York, has leased the building at 396-402 Eleventh Avenue, totaling about 50,000 sq. ft., for a new works and distributing plant.

The Leonard Oil Development Co., care of R. H. Weatherhead, Jr., syndicate manager, 61 Broadway, New York, is disposing of a stock issue of \$1,400,000, the proceeds to be used for the installation of machinery and development of company properties in Colombia and Ecuador, including drilling equipment, pumping machinery, etc. John W. Leonard, Washington, Pa., is president.

The board of directors, Masonic Home, Utica, N. Y., will build a new refrigerating and cold storage plant, with warehouse, to cost about \$100,000, including equipment. H. P. Knowles, 21 West Forty-ninth Street, New York, is architect.

Leon Nadel, New York, has leased the building at the southwest corner of Whitlock and Bryant Avenues, on site 140 x 150 ft., for an automobile service and repair works.

The Department of Police, 240 Center Street, New York, will build a two-story garage, with machine shop and repair department, at Richmond Terrace and Wall Street, St. George, S. I.

The Wire Wheel Repair Co., 148 West Fifty-fifth Street, New York, has leased the two-story building at 137 West Fifty-sixth Street for a new plant. The structure will be remodeled.

The Schaeffer & Budenberg Mfg. Co., 338 Berry Street, Brooklyn, manufacturer of thermometers, engineering specialties, etc., has been consolidated with the American Steam Gage & Valve Mfg. Co., 208 Camden Street, Boston, manufacturer of a similar line of products. Both plants will be continued in operation.

The New York Central Railroad Co., Grand Central Terminal, New York, will convert its electric generating plant at Yonkers, N. Y., for oil-burning instead of coal. Plans for the new installation are being completed.

Officials of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, have organized the Mammoth Oil Co., under Delaware laws, with capital of \$200,500,000, as a subsidiary organization. The new company will operate properties, refineries, etc., in the Teapot Dome fields, Wyoming.

The M. W. Kellogg Co., 117 Westside Avenue, Jersey City, N. J., manufacturer of power plant specialties, piping, etc., has filed plans for a one-story addition, to cost about \$150,000, including equipment.

The B. C. Tillinghast Rubber Mfg. Co., Stockton, N. J., recently organized with a capital of \$100,000, has acquired the plant of the Stockton Rubber Co. from the receiver. The mill has been closed for more than a year and will be remodeled and improved; new machinery to cost about \$30,000 will be installed. It is expected to have the plant

ready for operation late in October. William J. McLaughlin is vice-president and general manager, and Dominick Price, secretary and treasurer.

The Hackensack Improvement Commission, Hackensack, N. J., will receive bids until Sept. 25 for pumping equipment, motors and switchboards, to be installed in the municipal sewage plant now in course of construction. Lemuel Lozier, room 3, Bank Building, Main and Mercer Streets, is engineer.

Fernando C. Mesa, Newark, operating an ammunition plant on Chancellor Avenue, Irvington district; R. D. Mesa and Hugo F. Bente have acquired the plant of the Independent Lamp Works, 80 Bergenline Avenue, Union, N. J., from Isadore Haber, receiver. The new owners will reorganize the company and operate the works for the manufacture of incandescent electric lamps.

The Pennsylvania-Jersey Power Co., Jersey City, N. J., recently organized with a capital of \$125,000, is planning the construction of a hydroelectric power plant on the Delaware River. The company is headed by Alfred B. Nelson, Charles W. Alpaugh and H. Otto Wittpenn, and represented by Frederick W. Rugge, 75 Montgomery Street, Jersey City.

The J. W. Murray Mfg. Co., 1975 Clay Street, Detroit, manufacturer of automobile bodies and fenders, has leased a portion of the plant of the Durant Motors, Inc., Elizabeth, N. J., for a branch plant. The works will be devoted to the manufacture of bodies and fenders for the Star automobile and other Durant cars. Equipment will be installed to provide for the employment of about 500 men.

The Department of Streets and Public Improvements, City Hall, Newark, Thomas L. Raymond, director, will receive bids until Sept. 21 for a quantity of castings for Watson wagons used by the department.

Charles H. Bennett, 39 Saybrook Place, Newark, N. J., has plans under way for a new two-story automobile service and repair works, to cost about \$100,000. Guilbert & Betelle, 546 Broad Street, are architects.

The Newark Automobile Corporation, 436 Clinton Avenue, Newark, will erect a new two-story building at Clinton Place and Quitman Street, to include service and repair departments, estimated to cost about \$50,000.

Chicago

CHICAGO, Sept. 11.

MACHINE tool sales have been comparatively light the past week, although considerable business is at the point of closing. General machine shops are taking little interest in the market, but further orders are expected from the railroads and some of the larger industries. The Chicago, Burlington & Quincy will buy against its machine tool lists soon. The Atchison, Topeka & Santa Fe has purchased two milling machines against its old inquiry and still has one or two additional tools to purchase. The Studebaker Corporation, South Bend, Ind., has practically completed buying for its No. 2 plant, but has commenced the construction of an addition to its No. 1 plant. This increased capacity will be used for the manufacture of bodies and springs, and considerable equipment is to be bought. The Nash Motor Co. will duplicate some of its machine tool equipment at its Milwaukee plant, but has not yet done any buying. The International Harvester Co. continues to place orders for its local tractor plant, although some call for special purpose machines, a local tool manufacturer having been awarded an order for several special boring machines. The company looks forward to good business in 1923 and is expected to purchase considerably more machine tool equipment. The Universal Portland Cement Co., Burlington, Ind., has finally purchased a few machines, involving about \$7,000, which were listed in an inquiry issued last spring. The Chicago, Rock Island & Pacific is also displaying an interest in a few items on a list which it put out months ago.

Further price advances are reported. The Cincinnati Milling Machine Co. has readjusted its prices, effective Sept. 15, advances ranging from 10 per cent up. The Cincinnati Shaper Co. will advance prices about 20 per cent, effective Oct. 1. The Universal Boring Machine Co., Hudson, Mass., has raised prices on horizontal boring mills approximately 10 per cent.

The remaining electric traveling cranes on the Burlington inquiry have not yet been purchased. The Chicago & North-

western has ordered a 1½-yd. bucket coal handling gantry crane, 60 ft. between legs, from the Milwaukee Electric Crane & Mfg. Co. The crane will be leased to the Armour Grain Co. for use at the large grain elevator at South Chicago.

Stephen & Wolff, Inc., Buchanan & Loomis Streets, Rockford, Ill., recently incorporated with \$25,000 capital stock, has taken over the former business of Stephen & Wolff and is leasing a small foundry at this location for the manufacture of dental flasks, articulators, bolts for dental flasks, and a general line of bronze, brass, aluminum and white metal castings. The company expects to purchase an engine lathe and several milling machines and turret lathes.

The Electric Fireplace Mfg. Co., 3950 Prairie Avenue, Chicago, recently incorporated with \$20,000 capital stock, has leased a plant at the address given for the manufacture of electric fireplaces. No additional manufacturing equipment will be purchased for a time. The officers include Daniel L. Carlin, Daniel N. Meany and J. T. McDermott.

The Imperial Clock Co., Collinsville, Ill., recently incorporated with \$28,000 capital stock, has leased a plant at the corner of Main Street and Morrison Avenue, containing about 4000 ft. of floor space. Self-winding weight-driven clocks will be manufactured. The company will use about three multiple-spindle high-speed drill presses, three precision lathes to cost about \$2,000 each, gear cutters, milling machines, screw machines, saws, grinders, punch presses and woodworking machines. The officers are J. W. Wick, president, who is also president of Wick Pipe Organ Factory, Highland, Ill.; R. G. Kneidler, vice-president, and Arno Fowler, secretary and treasurer, who is also superintendent in active charge of the management of the business.

The Mid-West Boat & Barge Co., Inc., Grafton, Ill., recently incorporated with \$50,000 capital stock, will manufacture boats, barges, tanks, bridges, boat equipment and supplies, structural steel of all kinds, sheet metal work, life boats, work boats and life rafts. A plant containing 25,000 sq. ft. of floor space has been leased at Water Front and Oak Streets. Equipment has been purchased. Officers are Albert A. Coyle, president; John F. Erdelen, vice-president; Samuel Edwards, secretary and treasurer, and Maurice Killeen, manager.

The Acme Tool Co., West Allis, Wis., recently incorporated, has leased buildings at 487-495 Fifty-sixth Avenue, West Allis, Wis., and will manufacture a full line of mason's, carpenter's and cement finisher's tools. The plant is fully equipped for the time being. Officers are J. F. Schnauffer, president; P. H. Mayes, vice-president and George Hoffmann, secretary and treasurer.

The Holmes Projector Co., recently incorporated with \$30,000 capital stock, has leased a plant at 432 West Superior Street, Chicago, and will manufacture a motion picture machine. Equipment has been purchased. Officers are C. J. Holmes, president; A. B. Gould, vice-president, and C. M. Swan, secretary and treasurer.

Snow Brothers, automobile dealers, 1011 South Boulevard, Oak Park, Ill., have let contract for a one-story service station and garage, 66 x 165 ft., to cost \$50,000.

Luther Brothers, 3523 North Cicero Avenue, Chicago, are asking bids through an architect on a one-story garage, 100 x 150 ft., to cost \$60,000.

The Bates Water Bag Co., 7310 South Chicago Avenue, Chicago, will build a two-story factory, 100 x 120 ft., at 8232-40 South Chicago Avenue, to cost \$60,000.

The Florence Art Co., 671 West Ohio Street, Chicago, manufacturer of lamp standards, book ends, and candle sticks, from composition material, is receiving bids through Michin, Spitz & Co., 19 West Jackson Boulevard, on a four-story factory, 50 x 108 ft., in North California Avenue and State Street, to cost \$150,000.

The General Porcelain Enameling Co., 4554 West Congress Street, Chicago, has let contract for a one-story factory, 125 x 170 ft., at 4101-29 Parker Avenue, to cost \$48,000.

The Western Electric Co., Hawthorne, Ill., will commence work Sept. 15 on a one-story building, 175 x 556 ft., for the manufacture of heavy rods and wire. The structure will cost \$1,000,000.

The Reynolds Wire Co., Dixon, Ill., is completing plans for a new four-story factory, 150 x 150 ft., and will take bids at once. The W. W. Beach Co., Warnock Building, Sioux City, Iowa, is engineer.

The Common Council, Loveland, Colo., is planning for the construction of a hydroelectric power house on the Big Thompson River, Loveland Canyon, estimated to cost close to \$400,000, including equipment. L. C. Osborn is engineer.

George McArthur & Sons, Baraboo, Wis., operating the Baraboo Towel Mills, are having plans completed for a new hydroelectric power plant on the Baraboo River. The initial unit will cost about \$30,000.

The Perfection Radio Laboratories Co., 525 Kenilworth

Court, Clinton, Iowa, manufacturer of wireless equipment, has preliminary plans under way for a new two-story factory, 100 x 300 ft., to cost \$100,000, including machinery. Barger & Musse, 1010 South Fourth Street, are engineers.

A. R. Jensen, Albert Lea, Minn., is arranging a list of equipment for installation in a local automobile service and repair works.

The Post Office Department, Washington, is arranging for the erection of a new aircraft plant at Broadview, Ill., for the Chicago mail service. It will comprise an assembling plant, 40 x 100 ft.; aircraft factory, two stories, 100 x 140 ft., with machine shop, wood-working and other departments, and general warehouse. A power house will be equipped and two hangars, each 100 x 100 ft., constructed. The general superintendent, room 320, Post Office Building, Washington, is in charge.

The Herrick Refrigerator Co., Waterloo, Iowa, has acquired a site for a two-story addition, 42 x 80 ft., with one-story structure adjoining, 32 x 50 ft., estimated to cost about \$30,000.

The Waukegan Generating Co., Waukegan, Ill., has plans nearing completion for a new steam-operated electric power house on Dewey Street, estimated to cost in excess of \$600,000. The initial unit will have a capacity of 25,000 kw. Sargent & Lundy, 72 West Adams Street, Chicago, are mechanical engineers.

The board of directors, North Shore Sanitary District of Lake County, 295 Anderson Building, Lake Forest, Ill., will receive bids until Sept. 28 for pumping machinery, motors, tanks, filters and other equipment in connection with the two new sewage treatment plants to be constructed. Pearse, Greeley & Hansen, 39 West Adams Street, Chicago, are consulting engineers.

The State Highway and other departments, Pierre, S. D., A. C. Hunt, Secretary of State, have commissioned J. C. Buckbee & Co., 38 South Dearborn Street, Chicago, engineers, to prepare plans for the proposed State-owned cement manufacturing works at Rapid City, S. D., estimated to cost close to \$2,000,000, including machinery.

A vocational department will be installed in the new high school to be erected at Lake City, Iowa, for which bonds for \$100,000 will be voted at a special election, Sept. 15. William Gordon, Hubbell Building, Des Moines, Iowa, is architect.

Philadelphia

PHILADELPHIA, Sept. 11.

A FIVE-STORY factory, 75 x 160 ft., to be erected by Joseph J. Greenberg, Morris Building, at Broad and Thompson Streets, has been leased by the Nash Automobile Co., Philadelphia, for local headquarters, with service, repair and parts departments. Bids for construction will be asked at once.

The Autocar Co., Ardmore, Pa., manufacturer of motor trucks, is disposing of a preferred stock issue of \$1,000,000, a portion of the proceeds to be used for extensions and additional working capital.

The L. H. Gilmer Co., Cottman and Keystone Streets, Philadelphia, manufacturer of belting, etc., has plans under way for an addition. A power house will also be built. Norman Hulme, 1524 Chestnut Street, is architect.

The Department of Supplies, Board of Education, Nineteenth and Chestnut Streets, Philadelphia, is planning to purchase lathes, drill press, jaw chucks, etc., for the vocational department at one of the city schools.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is taking bids until Sept. 14 for new repair shops at Enola, Pa., for steel freight work. A. C. Shand is chief engineer.

The Bureau of Accounts and Supplies, Navy Department, Washington, will receive bids until Sept. 26 for 200 storage batteries for the Philadelphia Navy Yard.

Alfred Box & Co., 813 North Front Street, Philadelphia, manufacturer of hoisting machinery and parts, cranes, etc., has awarded contract to the John N. Gill Construction Co., Otis Building, for a new building at Janney and Ontario Streets.

The Trenton Patent Mfg. Co., 219 Park Street, Trenton, N. J., manufacturer of metal products, has plans for a new factory at East Trenton, where a site has been acquired, for the manufacture of a special cylinder grinding machine, new type piston rings, and kindred specialties. The company has arranged for an increase in capital from \$200,000 to \$500,000. W. H. Jaeger is president and treasurer.

The Magnetic Pigment Co., Cass Street, Trenton, N. J., has filed plans for an addition, estimated to cost \$50,000.

The Hinde & Dauch Paper Co., Gloucester, N. J., manufacturer of corrugated paper products, will build a one-

story addition, 60 x 140 ft., to be equipped for taping, slitting and other operations. Headquarters of the company are at Sandusky, Ohio.

The Hummel Electric Steel Foundry Co., Conshohocken, Pa., has acquired the plant and business of the Conshohocken Electric Steel Foundry, which it will continue as a branch works. Improvements are planned. The two organizations will be consolidated.

Samuel H. Bell, Reading, Pa., is negotiating for the establishment of a plant to manufacture inner tubes and other rubber specialties.

A one-story power house will be constructed by the Gilbert Wall Paper Co., 728 Linden Avenue, York, Pa., in connection with its new plant. J. A. Dempwolf, Casset Building, is architect.

A vocational department will be installed in the new high school to be constructed at Dallas, Pa., estimated to cost about \$150,000. The Board of Education will select an architect to prepare plans at an early date.

The Board of Cumberland County Commissioners, 32 West High Street, Carlisle, Pa., will take bids at once for a central power house and heating plant for the County institutions. Frank G. Fahnestock, Jr., Patriot Bldg., Harrisburg, Pa., is architect.

Vocational departments will be installed in the two new junior high schools to be erected at Lancaster, Pa., estimated to cost about \$450,000, each, for which bonds have been voted. The Board of Education will complete plans and commence work at an early date.

C. K. Stadler, Scranton, Pa., head of the C. K. Stadler Co., recently organized, has acquired a site for a factory to manufacture iron and steel products. Plans will be prepared at an early date.

The Holmes Garage Co., West Fairview, Pa., is planning to rebuild its service and repair works recently destroyed by fire. The loss included tools and equipment.

The Lowhill Power & Light Co., Lowhill, Pa., is being organized by C. M. Walters, L. K. Bingham and P. B. Sawyer, all of Allentown, Pa., to build an electric light and power plant and system in Lowhill Township. The same interests are also organizing the Heidelberg Light & Power Co., to operate a plant and system in Heidelberg Township. The companies are represented by Thomas J. Perkins, Allentown.

The Standard Provision Co., 212 North Front Street, Philadelphia, will install an ice and refrigerating plant in its three-story packing house, 70 x 160 ft., at Willow and Callowhill Streets, estimated to cost \$150,000. Conveying and other mechanical apparatus will be installed.

Gaul, Derr & Shearer, 212 North Broad Street, Philadelphia, will build a two-story automobile service and repair works, 56 x 105 ft., at Fairmount Avenue and Sixteenth Street, estimated to cost \$100,000. Durham Brothers, 1609 Sansom Street, are architects.

The Phoenix Portland Cement Co., Real Estate Trust Building, Philadelphia, with plant at Nazareth, Pa., will build a power house, machine shop and other buildings in connection with its new plant at North Birmingham, Ala., estimated to cost in excess of \$2,000,000. Lindley C. Morton is president, and R. S. Scott, consulting engineer.

Buffalo

BUFFALO, Sept. 11.

CONTRACT has been awarded to John A. Zoll, 398 Bird Avenue, by the Angola Tire & Rubber Co., 270 North Division Street, Buffalo, for a one story addition, 30 x 80 ft.

The General Metalsmiths, Inc., 313 Prendergast Avenue, Jamestown, N. Y., manufacturer of architectural and other bronze, copper and metal products, has awarded contract to Chapman & Graham, 132 Blackstone Avenue, for a new one-story plant, 60 x 250 ft., to cost about \$140,000, including equipment. B. C. Davis is general manager.

T. W. Warner, vice-president Durant Motors, Inc., 1819 Broadway, New York, has acquired at a public sale the plant of the New Process Gear Corporation, Syracuse, N. Y., a subsidiary of the Willys Corporation, for \$1,904,000. The purchase, it is said, has been made for individual account. The plant will be continued in operation and tentative plans are under consideration for enlargements.

Klepper Brothers, 1029 Main Street, Buffalo, are taking bids for a two-story automobile service and repair building, 235 x 570 ft. Albert H. Hopkins, 447 Main Street, is architect.

The Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive products, has awarded contract to the Turner Construction Co., 242 Madison Avenue, New York, for an addition, 50 x 60 ft.

The Tonawanda Board & Paper Co., Tonawanda, N. Y., operating on Goose Island, is planning for the construction

of a new water power plant, estimated to cost \$50,000. Maurice W. Simon is president.

Vocational departments will be installed in the two high schools to be erected at Jamestown, N. Y., to be known as the North and South Junior high schools, each two stories and basement, 150 x 190 ft., and 150 x 185 ft., respectively, for which bids on a general contract will be asked at once. The schools will cost \$375,000, and \$335,000, respectively. Guilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Syracuse Intercepting Sewer Board, room 104, City Hall, Syracuse, N. Y., will receive bids until Oct. 10 for equipment for the pumping station now in course of construction, including four 24 in. centrifugal pumps, direct-connected to 75-hp. variable speed motors; priming pumps and sump pumps; 10-kw. motor generator sets; switchboard and control mechanisms, hydraulically operated sluice gate valve, and three electrically operated sluice gate valves; one 7½-ton, hand-operated, traveling crane; tramrail, with electrically operated hoist and ½-cu. yd. capacity clam shell bucket, piping, wiring, etc. Harry J. Hamlin is secretary.

The Board of Education, Lockport, N. Y., is arranging a list of metal-working and other equipment for installation in the vocational shop at the Chestnut Street school.

J. B. White, Bemus Point, N. Y., has plans in preparation for a two-story automobile service and repair works. Johnson & Ford, Fenton Building, Jamestown, N. Y., are architects.

The Globe Malleable Iron & Steel Co., 101 Greenway Avenue, Syracuse, N. Y., is planning for the erection of an addition to be used for the most part for the manufacture of oil-operated engines and parts. H. E. Elmer is treasurer and general manager.

The Board of Public Works, North Tonawanda, N. Y., has plans nearing completion for the installation of three lift pumping stations, with electrically operated machinery, estimated to cost \$50,000.

Christian Schlicker, 12 Bloomingdale Street, Rochester, N. Y., is planning to purchase precision and other equipment for the manufacture of surgical instruments.

A vocational department will be installed in the new high school to be erected at Attica, N. Y., for which bonds for \$262,000 have been voted.

New England

BOSTON, Sept. 12.

WITH the month almost half over, September promises to be an unprofitable period for machine tool dealers in this section. The only sale of importance reported the past week was a 90-in. driving wheel lathe purchased by the Boston & Albany Railroad for its Springfield shop. Sales of individual tools of much less value are noted, but the aggregate is not more than a dozen. Garages predominate among the purchasers of used equipment. Reports from machine tool builders are more encouraging than from dealers. Prices on new machine tools hold firm. The cost of castings, labor, etc., has reached a point where production and selling prices are close. It is difficult to size up used tool prices because of the inactivity in the market.

Small tools continue to move fairly well, but not as freely as last month. Prices are steadily maintained. Manufacturers of files have advanced prices 10 per cent.

Bids have closed on a proposed plant, three stories, 60 x 240 ft., to be erected at Attleboro, Mass., by the Hartley Clock Co., 68 Devonshire Street, Boston.

The H. & B. American Machine Co., Pawtucket, R. I., has awarded contract for a one-story addition, 100 x 280 ft., to its Attleboro plant.

J. E. Conant & Co., Lowell, Mass., auctioneers, report that approximately \$236,000 in real estate, machinery and mechanical equipment was disposed of at the recent sale of the Morris Metal Products Co. Bridgeport, Conn., plant.

Some New England builders of wood-working machinery are busy and instances are noted where work has been given to outside firms in an effort to keep up with orders. Trade schools and foundries are among the largest buyers of such equipment. The Board of Education, Westfield, Mass., has taken bids for a considerable amount of wood-working and pattern making equipment for a trade school.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has leased 10,000 sq. ft. of space in the factory of the Bridgeport Engineering Co., Seymour Street, Stratford, for the establishment of a service and repair plant for the Naugatuck Valley

district. L. D. Canfield, district sales manager in charge of the New York territory, will have the supervision of the new plant.

The Belknap Mfg. Co., 149 Water Street, Bridgeport, Conn., manufacturer of steam and water goods, etc., has purchased the machine shop of the former Morris Metal Products Co., on Union Avenue. It is two stories, 190 x 375 ft., of brick and steel. Price is said to be \$100,000. The Belknap company is moving from its factory on Water Street.

The Salmon Falls Mfg. Co., cotton goods, Salmon Falls, N. H., has awarded contract for the construction of the new hydroelectric power station to the Central Engineering & Construction Co., Central Falls, R. I. It will be one story, 30 x 80 ft., of reinforced concrete, and will cost about \$250,000. C. T. Main, 200 Devonshire Street, Boston, is the engineer.

The Boston Sand & Gravel Co., 88 Broad Street, Boston, will build a new one-story machine shop on Condon Street, East Boston, to cost about \$13,000. P. F. Ayer is secretary.

The Shambow Shuttle Co., Woonsocket, R. I., manufacturer of textile equipment, has acquired the plant of the Saluda Co., near Greenville, S. C., for the establishment of a branch plant. The present buildings will be remodeled.

The Westfield Machine Co., Westfield, Mass., manufacturer of wireless equipment, etc., is said to be planning to rebuild the portion of its factory destroyed by fire Aug. 15.

Herbert B. Rust, Concord, N. H., and associates, have made application for permission to construct a hydroelectric power plant on Ayer's Island, Penigewasset River, near Bristol, N. H., to cost close to \$1,000,000, including dam and transmission system.

H. Frederick Hadden, South Berwick, Me., is in the market for a machine to turn hammer and axle handles.

The Board of Contract and Supply, Providence, R. I., will install two portal gantry cranes at the municipal wharf, Fields Point.

Pittsburgh

PITTSBURGH, Sept. 11.

THE local machine tool trade still is sustained by hope rather than performance. There is no lack of inquiry and some prospects which run into fairly large sums of money have been quoted against, but orders for the most part are for individual tools and generally out of dealers' stocks. Dealers having tools, which they have carried for some time, have been making an effort to clean them out and some extremely low prices have been named. With manufacturers' quotations showing a strong upward tendency, prices quoted on dealers' stocks have been exceptionally attractive. As far as results are concerned, however, buyers have figured the low prices to mean that the tools were out of date and have been cautious. The demand does not yet appear to be broad or strong enough to sustain advances in quotations and it is admitted that on recent business competition ruled the prices that were paid.

In heavy equipment the past week has been featured by the placing of the mills and drives for the new sheet mill of the Weirton Steel Co., Weirton, W. Va., the mills being awarded the United Engineering & Foundry Co., while the drives, two 1200-hp. motors, equipped with liquid slip regulators, will be furnished by the Allis-Chalmers Mfg. Co. The Allis-Chalmers Mfg. Co. also has taken a 100-hp. motor for a mill drive for the American Nickel Corporation, Hyde, Pa. The Westinghouse Electric & Mfg. Co., recently was awarded a 3000-kw. turbo-alternator by the U. S. Coal & Coke Co., a Steel Corporation subsidiary, Gary, W. Va. The state market is slow as far as sales go, but there seems to be no decline in inquiry and cranes for the sheet mill of the Weirton Steel Co. and for the Granite City, Ill., plant of the National Enameling & Stamping Co. are expected to be placed this week.

The Gifford-Wood Co., 26 Second Hill, Hudson, N. Y., manufacturer of elevating and conveying machinery, ice machinery, etc., has purchased property at Hulton, near Pittsburgh, for a branch plant. The present buildings will be remodeled and operations commenced at an early date. About 150 men will be employed for initial production. William B. Wood is president, and Benjamin Gifford, vice-president.

The Chevrolet Motor Co., Baum Boulevard, Pittsburgh, has leased two floors in the building at Bennett Street and Girl's Alley, for extensions in its service and repair departments.

The board of directors, Duquesne University, Pittsburgh, will build a new power house to cost about \$150,000, including gymnasium building, adjoining.

The Keystone Garage, Monongahela, Pa., will soon take new bids for a two-story service and repair works, 60 x 200 ft., estimated to cost close to \$50,000. C. K. Downer, 248 Boylston Street, Boston, is architect.

The West Penn Traction & Water Power Co., West Penn Building, Pittsburgh, has tentative plans for a new power house near Charleroi, Pa., to cost about \$850,000, including transmission system.

E. M. Bowen, Oil City, Pa., operating a Ford automobile agency, is taking bids for a three-story service and repair works, 70 x 80 ft., estimated to cost \$45,000. W. H. Crosby, Masonic Building, is architect.

The Buick Motor Co., Baum Boulevard and Euclid Street, Pittsburgh, has awarded contract to Conley & DeMey, Pittsburgh, for a new building for local headquarters, including service and repair departments, etc., estimated to cost \$200,000.

The Beech Bottom Power Co., Beech Bottom, W. Va., is planning to rebuild the portion of its power house destroyed by fire Sept. 1, with loss estimated at about \$30,000, including equipment.

The Centre Foundry & Machine Co., 2011 Main Street, Wheeling, W. Va., is planning for the installation of additional equipment at its Warwood, W. Va., foundry.

R. E. Matticks, Logan, W. Va., is preparing plans for a three-story automobile service and repair building, 52 x 120 ft., to cost \$50,000. Meanor & Handloser, Robson-Pritchard Building, Huntington, W. Va., are architects.

The Guyan Machine Shops, Logan, W. Va., are making inquiries for a slitting shear and punch, to handle 1/2-in. plate.

The A. C. Love Co., Huntington, W. Va., is in the market for a 40-hp. locomotive boiler with engine.

The Ellwood Steel Corporation, Elwood, Pa., plans the installation of new wire-drawing and other equipment at the plant of the Sharon Pressed Steel Co., recently acquired.

Detroit

DETROIT, Sept. 11.

INQUIRIES for machine tools have been very light since the latter part of August. That month, however, showed a good volume of business, one representative reporting the best business for any month this year. The Ford Motor Co. notified machine tool manufacturers that it would receive all orders placed and continue repairs on all machinery.

Dodge Brothers, Detroit, have announced that work will begin immediately on the construction of an eight-story addition to their plant, to cost about \$1,500,000. The new building will contain approximately 500,000 sq. ft. and will be 400 ft. long. It will be used entirely for manufacturing purposes and will enable the company to increase its production from 650 to 900 or 1000 cars per day.

Campbell, Wyant & Cannon, Muskegon, Mich., are completing the second unit of their foundry, on which operations were suspended in 1920, and expect to take off the first heat the latter part of September. The plant is being equipped with special machinery for the production of automobile castings and will cost \$1,500,000.

The Green Wrench Co., Marshall, Mich., has been incorporated with a capital stock of \$50,000 and will let contracts for drop forging and screw machine work. Other machining and assembling will be done at the company's plant. It is in the market for disk grinders, milling machines, geometric threading machines, light horizontal drilling machines and supplies. Paul G. Green is president.

The Minneapolis, St. Paul & Sault Ste. Marie Railroad Co., Minneapolis, Minn., is planning to rebuild its shops at Gladstone, Mich., destroyed by fire a few months ago. The new buildings will include engine house, machine shops, rail shop, assembling works and, with machinery, will cost approximately the amount of the fire loss.

The Hayes Wheel Co., Jackson, Mich., will commence the immediate erection of a one-story addition, 100 x 160 ft., and one-story power house, 50 x 60 ft., estimated to cost in excess of \$200,000, with equipment. The company has closed contracts with the Durant Motors, Inc., New York, for wheels for the Durant, Star and other automobiles under this management.

The Munising, Marquette & Southeastern Railway Co., and the Lake Superior, Ishpeming Railway Co., affiliated roads, both of Marquette, Mich., have plans for new shops on local site, including general machine repair shop, coach works, steel

car shops and other buildings, estimated to cost \$300,000, with machinery. H. R. Harris is general manager of both roads, which are operated by the Cleveland-Cliffs Iron Co., Cleveland.

The J. & S. Plating Co., Jackson, Mich., recently organized, will operate a plant at 112 East Washington Street for the manufacture of plated metal products, primarily for automobile service. George J. Sights is general manager.

Baltimore

BALTIMORE, Sept. 11.

THE Smith & Williams Shipbuilding Co., Salisbury, Md., has acquired about 8 acres adjoining its plant for extensions. Plans are under way for a new cradle railroad, 250 ft. long, with hauling capacity for 1000-ton vessels and smaller, with additional construction and repair shops, estimated to cost about \$40,000.

The Richmond Pressed Metal Works, Inc., 601 Stockton Street, Richmond, Va., has awarded contract to the F. H. Boatwright Co., Richmond, for a new one-story plant, 110 x 160 ft., to cost about \$30,000. The installation will include shears, punch presses, plating equipment etc. The company recently increased its capital to \$150,000 for expansion.

The Parker Mfg. Co., Suffolk, Va., manufacturer of carriages, wagons and parts, has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss of about \$50,000. The new structure will cost approximately a like amount, including equipment. C. E. Parker is head.

The Wilmington Sugar Refining Co., South Wilmington, Del., is perfecting plans for the early resumption of construction of its local refinery, held in abeyance for a number of weeks. The proposed buildings with machinery will cost in excess of \$5,000,000.

A vocational department will be installed in the new two-story high school, 80 x 280 ft., to be erected at Claymont, Del., estimated to cost \$275,000, for which bids will be called at once. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 3 for an industrial electric truck for the Mare Island Navy Yard, San Francisco, as set forth in schedule 136; until Sept. 19, for 19,500 ft. of electric cable for the Portsmouth, N. H., Navy Yard, as specified in schedule 128.

Lane Brothers, 3117 West North Avenue, Baltimore, are completing plans for a two-story automobile service and repair building, 50 x 150 ft., on North Avenue. Bids will soon be asked by W. B. Gerwig, 600 Equitable Building, architect.

The Youghiogheny Power & Electric Co., Rockwood, Pa., is perfecting plans for hydroelectric power plants on the Youghiogheny River, near Oakland, Md., and on Muddy and Deep creeks, in the same district, estimated to cost in excess of \$500,000.

The Potomac Public Service Co., Hagerstown, Md., has acquired property at Williamsport, Md., for a new steam-operated electric generating plant, estimated to cost approximately \$1,500,000, with machinery and transmission system. The company is a subsidiary of the American Water Works & Electric Co., 50 Broad Street, New York.

The Saco-Lowell Shops, Charlotte, N. C., manufacturers of textile machinery, have awarded contract to T. C. Thompson & Brother, Charlotte, for a two-story machine shop, 80 x 160 ft.; repair and distributing shop and office at Mint and Commerce Streets, estimated to cost about \$150,000. Headquarters of the company are at 77 Franklin Street, Boston. Lockwood, Greene & Co., Atlanta, Ga., are architects and engineers.

A vocational department will be installed in the new high school to be constructed at Edgcombe, N. C., estimated to cost \$90,000, for which bids have been asked. The Board of Education, Tarboro, N. C., R. E. Sentell superintendent, is in charge. J. M. Kennedy, Merchants' Bank Building, Raleigh, N. C., is architect.

The Norfolk & Western Railway Co., Norfolk, Va., will install new electrically-operated coal dumping and handling machinery at its Pier No. 3, to double, approximately, the present capacity. It will also make improvements in install new machinery at its Lamberts Point coaling piers. The entire work will cost approximately \$600,000.

The Shambow Spool Co., Greenville, S. C., has tentative plans for rebuilding the portion of its wood-working plant destroyed by fire Aug. 28 with loss estimated at \$60,000, including machinery. The company formerly was known as the Greenville Spool & Mfg. Co.

The Lamar Welding Co., Atlanta, Ga., recently organized, has acquired the plant of the Standard Gas Products Co., formerly known as the Bird-Wilcox Co., and will operate a

welding and general repair works. John Lamar heads the company.

John B. Biley, Richmond, Va., will build a two-story addition to his automobile service and repair works at 408 North Third Street, estimated to cost about \$15,000, exclusive of equipment.

The Board of Commissioners, St. Michaels, Md., is disposing of a bond issue of \$20,000, the proceeds to be used for extensions and improvements in the municipal electric plant and system. Thomas H. Sewell is town clerk.

The Purchasing Agent, Post Office Department, Washington, will take bids until Sept. 18, for 500 boxes of lock washers, $\frac{3}{4}$ x $\frac{3}{16}$ x $\frac{3}{32}$ in.

The Dawson Variety Co., Dawson, Ga., is planning to rebuild its machine shops recently destroyed by fire. An official estimate of loss has not been announced.

A vocational department will be installed in the new junior high school to be erected at Atlanta, Ga., to be known as the Northwest Junior High School, for which bids have been asked. It will cost in excess of \$190,000. Marye, Alger & Alger, Inc., Atlanta, are architects.

The Georgia Cement & Stone Co., Portland, Ga., is remodeling its works and plans to place the mill in operation at an early date. New equipment will be installed. The company was acquired recently by the Nicholson Corporation. John A. Blank is general superintendent.

Walden & Massengill, McIntyre, Ga., recently organized, will operate clay properties in this section and contemplate the installation of a refinery later. The company is headed by H. A. Walden and C. G. Massengill.

Cleveland

CLEVELAND, Sept. 11.

MACHINE-TOOL business continues dull, although there seems to be a little improvement in some lines. A local manufacturer of vertical boring mills reports an increase in orders but manufacturers of turret lathes have made few sales this month. No new inquiry is coming from the railroads. A local dealer the past week booked an order for 11 lathes for equipping a new plant in Cleveland to manufacture automobile parts, and the same interest, recently reported as inquiring for about 40 machines, is understood to have also purchased eight other tools. With this exception dealers' sales were limited to single machines.

Announcements of price advances continue. The Rockford Milling Machine Co., Rockford, Ill., on Sept. 15 will advance prices 10 per cent on cone drive milling machines and $12\frac{1}{2}$ per cent on single pulley drive machines. The Foster Machine Co., Elkhart, Ind., has announced a slight advance on its line of screw machines.

Locomotive crane builders report an improvement in inquiries. The Alpha Portland Cement Co. has placed an order with the Whiting Corporation for a 30-ton locomotive crane.

The Otis Steel Co. continues to purchase equipment for its new plant. It has placed orders with the Alliance Machine Co., Alliance, Ohio, for eight cranes for its open-hearth blooming mill and sheet bar mill departments. The order includes a 175-ton and a 100-ton ladle crane and six cranes of 50 tons and smaller capacity. Six or eight cranes for its strip mill are still to be placed. The company has placed with the Mackintosh Hemphill Co. an order for a 24-in. sheet bar mill and recently placed an order for a 40-in. blooming mill with the same company.

The American Coach & Body Co., Cleveland, has purchased two plants of the James Holam Mfg. Co., of that city, one at Clark Avenue and West Thirty-eighth Street, for the manufacture of automobile bodies, and the other at Clark Avenue and West Forty-first Street, to be used for a metal-working shop. The Holam company has retained a third plant on Brook Park Road.

The Industrial Tool Co., Cleveland, has been formed to engage in jobbing and special machine work and has placed orders for a number of machine tools for its plant at 5518 Euclid Avenue. George Somerfield is the manager.

The Cleveland Stone Co., Cleveland, has purchased the plant of the Sterling Grinding Wheel Co., Tiffin, Ohio, manufacturer of grinding wheels and grinding machines. The purchase of stock of some of the large owners was made recently and a few days ago the remainder of the stock of the company was purchased. The deal is reported to have

involved approximately \$250,000. The new owners plan to enlarge the plant and extend the line of manufacture of abrasive wheels and materials. The Grinding Wheel company has been reorganized with the election of H. W. Caldwell, president; D. W. Walter, vice-president, and J. R. Miller, secretary. These men are respectively vice-president, president and secretary of the Cleveland Stone Co.

Milwaukee

MILWAUKEE, Sept. 11.

INCREASING activity is noted by machine-tool manufacturers so far this month which is an improvement over the average for August. Some requirements are coming from the railroads and a considerably larger volume is expected to develop when shops of the transportation companies are on a more nearly normal basis. Automotive industries are buying steadily against current needs but placing no large lots. Inquiry the past week has been more active than for about three to four weeks, probably owing to the better industrial and transportation outlook and the prospect of higher prices. Actual business, however, is slow to develop. Tool builders are able to maintain operations without any let-down, with some showing small but steady gains in schedules and working forces.

The plant and property of the Conradson Machine Tool Co., Green Bay, Wis., has been purchased by Joseph T. Ryerson & Son, Chicago, for \$55,000, including the assumption of a mortgage of \$10,000. It is stated, however, that the Ryerson company expects to dispose of the property, since it is not engaged in the manufacturing business. It has been marketing the output of the Conradson company since this business was established about four years ago to manufacture turret lathes and other machine tools, bearing the name Conradson-Ryerson.

The Wheary-Burge Trunk Co., Racine, Wis., has been incorporated with a capital stock of \$500,000 by George W. Wheary, Harry L. Burge, Charles O. Bergener and Morton E. Walker, attorney. As previously noted, the interests which have been incorporated are establishing a factory on three floors of the former Racine-Sattley carriage works at Racine Junction, to manufacture trunks and other traveling goods. Machinery and other equipment is now being purchased.

The Sewerage Commission of Milwaukee, 508 Market Street, is asking bids until Sept. 29 for the complete equipment of a feed water softening and purification plant in connection with the steam generating plant under construction on Jones Island. John H. Fowles is secretary.

The M. Hilty Lumber Co., 3-15 Twelfth Street, Milwaukee, will build a general wood-working factory with a separate power plant representing an estimated investment of \$350,000 at the east approach to the Grand Avenue viaduct. It will be of brick and mill construction, 102 x 132 ft., three stories. The power plant will be equipped with a 500-hp. uniflow type engine, two 150-hp. boilers and superheaters, and a 250-kw. generator set. Cahill & Douglas, consulting engineers, 217 West Water Street, local, are designing the power plant and will purchase the equipment.

The Board of Education, Hayward, Wis., has engaged E. E. Johnson, architect, Superior, Wis., to draw plans for a new high school, with a vocational training department, to cost not more than \$150,000.

The Nekoosa Iron Works, Nekoosa, Wis., founder and machinist, has let the general contract to Manske & Henry, Wood Building, Wisconsin Rapids, Wis., for a one-story addition, 36 x 75 ft., estimated to cost \$15,000 with equipment. M. J. Powers is president.

The Marathon Motor Car Co., Wausau, Wis., Ford dealer, is buying additional equipment for a \$75,000 extension to its sales and service building now under construction. Miscellaneous floor equipment, shop fixtures, etc., are included in the requirements.

The Badger Cabinet Co., Plymouth, Wis., manufacturer of veneers, panels, cabinets, talking machines, etc., has decided to rebuild its factory, destroyed by fire Jan. 1 with loss of \$150,000. The present investment will be about \$75,000. The building will be of brick and tile, one story, 150 x 200 ft. A full complement of new machinery is being purchased.

E. H. Ramm, New London, Wis., has plans for a new garage and service shop building, 50 x 120 ft., to accommodate his branch house business at Clintonville, Wis. The cost is estimated at \$20,000 complete.

The Modern Auto Parts Co., Sheboygan, Wis., has been chartered to manufacture a general line of automobile accessories, parts and specialties. It is capitalized at \$18,000 and the principals are J. J. McNulty, R. P. Loop and H. J. Sieners. A small shop will be equipped at once.

The John Torrance & Son foundry, LaCrosse, Wis., was damaged about \$5,000 by fire Sept. 5, but little replacement of equipment will be required, and operations have been only slightly interrupted.

W. H. St. John, 205 North Van Buren Street, Green Bay, Wis., has engaged Earl F. Miller, Inc., architect, Appleton, Wis., to design a garage and machine shop, 48 x 120 ft., part two stories and basement, to be erected in Appleton. The cost is estimated at \$25,000.

The Kidwell Boiler & Engineering Co., 288-292 East Water Street, Milwaukee, has taken over the plant of the defunct Northwestern Bridge & Iron Co., at Thirty-second Street and Hopkins Road. Some re-equipment work is under way. The company specializes in the manufacture of high pressure boilers. J. F. Jackson is president and Edgar Kidwell general manager of the company.

The M. Hilty Lumber Co., 3-15 Twelfth Street, Milwaukee, will build a wood-working factory and power plant, representing an investment of \$350,000, at the east approach to the Grand Avenue viaduct. It will be three stories, 102 x 133 ft., of brick and mill construction, and was designed and will be erected under the supervision of Cahill & Douglas, consulting engineers, 217 West Water Street, Milwaukee. The power plant equipment to be purchased includes a 500-hp. uniflow type engine, two 150-hp. boilers and superheaters, and a 250-kw. generator set and appurtenances.

The Hohman-Nelson Co., Eau Claire, Wis., has been incorporated with a capital stock of \$14,000 to take over a foundry and machine shop business operated by A. B. Hohman and A. J. Nelson. J. G. Owen is associated with them in the development of the business. Plans for enlargement are under consideration, but details are not available.

Cincinnati

CINCINNATI, Sept. 11.

SO far this month the machinery market has not shown great activity, due to unsettled conditions as a result of the railroad strike and announcements that many manufacturing plants are about to close for lack of fuel. The tone of the market is distinctly improved, however, and a fair number of long outstanding inquiries are being closed. The certainty that prices of machine tools will advance, coupled with the announcements already made, is responsible in a large measure for a number of orders booked by local manufacturers the past week. Formal orders have not yet been received by makers who participated largely in the recent railroad buying, but these are expected this week. The only new inquiry of size comes from the Central of Georgia Railway Co., which has issued by telegraph a list of approximately 15 miscellaneous machines.

A manufacturer of boring mills has advanced prices approximately 10 per cent and it is expected that other announcements will follow shortly. The Cincinnati Milling Machine Co. has made an advance of approximately 12½ per cent on milling machines, effective Sept. 15.

Agricultural implement manufacturers report steadily increasing business, both for domestic and foreign account. Makers of wood-working machinery are running nearly full time and road-making machinery builders are operating at capacity. The foundry situation in this district shows but slight improvement, and if the Ford Motor Co. closes its plants on Sept. 16 a number of shops will be obliged to greatly reduce forces.

The Gardner-Harvey Paper Co., Middletown, Ohio, will build an addition to its plant to cost about \$150,000. New paper-making machinery will be installed.

The Rayner Auto Safe Lock Co., Louisville, Ky., has been incorporated with a capitalization of \$25,000 to manufacture a safety automobile lock invented by H. L. Rayner, who heads the company as president.

The Standard Bolt Corporation, Columbus, Ohio, which

was damaged to the extent of \$40,000 by fire on Aug. 30, will be rebuilt. Plans have been completed for a new finishing mill to replace the one destroyed and it is expected that work will commence within the next two weeks.

Work will commence shortly on an addition to the power plant of the Dayton Power & Light Co., Millers' Ford, Ohio. The new station will house three 2000-hp. boilers, and a 20,000-kw. steam turbine. The addition will also include a completely equipped machine shop, 60 x 140 ft.

Indiana

INDIANAPOLIS, Sept. 11.

A NEW one-story plant will be erected by the Automotive Gear Co., Richmond, Ind., care of J. W. Mueller, Richmond, 400 x 600 ft., estimated to cost \$45,000.

The Franklin-Indianapolis Co., Indianapolis, recently organized as a branch of the Franklin Automobile Co., Syracuse, N. Y., will establish a service and repair department in the building at 1112-14 North Meridian Street, to include a complete machine shop. H. H. Alexander and E. J. Erber head the company.

The Carbon Fire Brick & Coal Co., Carbon, Ind., will build an addition to its fire brick and refractory plant to cost about \$150,000, including equipment. E. E. Dean is president.

The Yellow Cab Line, Douglas and Harrison Streets, Indianapolis, will build a one and two-story and basement automobile service and repair works, 150 x 250 ft., at Fulton and Main Streets.

The Glencoe Coal Co., operating the Glencoe mine No. 1, near Terre Haute, Ind., plans for the early rebuilding of the power house at its properties, destroyed by fire, Sept. 3.

A vocational department will be installed in the two-story high school to be erected at Evansville, Ind., 30 x 250 ft., to cost about \$300,000. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

The International Lead Refining Co., McCook Avenue, East Chicago, Ind., will soon commence the erection of a one-story addition, 50 x 100 ft., estimated to cost about \$30,000.

J. E. Ford, Harrison and Douglas Streets, Fort Wayne, Ind., is completing plans for a two-story automobile service and repair building, 150 x 250 ft., estimated to cost \$75,000. C. R. Weatherhogg, Citizens' Trust Building, is architect.

The Universal Burner Co., Logansport, Ind., recently organized to manufacture oil burners and oil-burning devices, is selecting a site for a new plant. Allen Nelson, Logansport, heads the company.

The Rochester Bridge Co., Rochester, Ind., will arrange a portion of its local works for car repair operations. A contract has been secured from the Erie Railroad for light railroad car repairs.

The Gulf States

BIRMINGHAM, Sept. 11.

PLANs are being drawn for a new plant for the Trinity Paper Mills Corporation, Dallas, Tex., organized with a capital of \$6,000,000. It is estimated to cost in excess of \$300,000, including machinery. J. V. Webb is president; J. M. Irwin, vice-president, and Adam H. Davidson, treasurer.

The Birmingham Stove & Range Co., Birmingham, has preliminary plans for the construction of an addition. A new department will be installed for the manufacture of gas ranges. B. H. Hartsfield is general manager.

The La Feria Water Improvement District, Cameron County No. 3, La Feria, Tex., will receive bids until Sept. 27 for a Diesel or semi-Diesel engine, direct-connected to a centrifugal volute pump. A. W. Anthor is manager.

The Kreiss Process Products Co., room 205 Graham Building, Jacksonville, Fla., recently organized, has plans under way for a new factory to manufacture fertilizer products. The installation will include mixing apparatus, rotary dryers, screens, etc. William B. Taber is general manager.

Fire, Sept. 5, destroyed the sugar refinery of the Elm Hall Refinery, Napoleonville, La., with loss estimated in excess of \$1,000,000, including machinery. The company is operated by the I. Godchaux Sugar Co. It is planned to rebuild.

Paul O. Trahan, Gueydan, La., and associates, are organizing the Tractor Safety Attachment Co. to establish and operate a plant for the manufacture of patented mechanical specialties.

The Stringer Brothers Foundry Co., 109 North Dearborn Street, Chicago, manufacturer of cast iron plumbing products,

has commenced the erection of an addition to its branch plant at Gadsden, Ala.

The Atlantic Ice & Coal Co., Montgomery, Ala., is planning the erection of a new cold storage and ice-manufacturing plant to cost about \$250,000, including machinery.

The Sewerage and Water Board, New Orleans, will receive bids until Oct. 10 for one 6000-kw. steam turbine and auxiliary equipment, for municipal service. A. G. Moffat is secretary.

The Texas Power & Light Co., Dallas, Tex., has arranged for an increase in capital of \$500,000, the proceeds to be used for extensions and improvements in power plants and systems. The company is operating in 90 counties of Texas. J. E. Horn is treasurer.

The Sour Lake Lumber Co., Sour Lake, La., has tentative plans for rebuilding the portion of its mill destroyed by fire, Aug. 31, with loss close to \$300,000, including machinery.

Edward Michel and E. H. Madere, 205 Whitney Central Building, New Orleans, associated, are organizing a new company capitalized at \$100,000, to establish and operate a plant for the manufacture of special rotating cutting equipment.

The Common Council, Monroe, La., is arranging for a bond issue of \$15,000, the proceeds to be used for extensions and improvements in the municipal power plant.

The Alabama Machinery & Supply Co., Montgomery, Ala., is arranging for an increase in capital of \$100,000, a large part of the proceeds to be used for extensions and improvements.

The Bacon Motor Co., Miami, Fla., has awarded contract to P. J. Davis, Miami, for a two-story automobile service and repair building, 80 x 140 ft., estimated to cost close to \$90,000.

Fire, Sept. 2, destroyed a portion of the car shops and pumping plant of the Atlantic Coast Line Railroad, Lakeland, Fla. An official estimate of loss has not been made. It is planned to rebuild. Main offices of the company are at Wilmington, N. C.

The Gulf States Portland Cement Co., Demopolis, Ala., has plans for enlargements to double the present capacity of 1200 bbl. per day. Work will commence at an early date and a list of equipment prepared.

The Jarreau Motor Co., New Orleans, has acquired property at Carrollton Avenue and Fontainebleau Drive, for a two-story service and repair building, 30 x 110 ft.

Strickland & Hazard, Ripley, Miss., are planning to rebuild their lumber plant, including saw mill and planing mill, recently destroyed by fire with loss estimated at \$60,000, including equipment.

The Central South

ST. LOUIS, Sept. 11.

THE Kaw Boiler Works, Parallel Avenue, Kansas City, Mo., is planning for an addition to its local works to double approximately the present capacity. The main plant and headquarters are at Kansas City, Kan.

J. C. Conley, 623 Murdock Street, Wichita, Kan., operating a general machine and repair shop, will install a new lathe, drill press and other tools.

The Arkansas Light & Power Co., Arkadelphia, Ark., is planning the installation of a hydroelectric power plant on the Illinois River, near Russellville, Ark., to include two electric generators, water turbines and auxiliary machinery, estimated to cost close to \$100,000. Plans are also under way for a new pulverized fuel plant in the vicinity of Bernice, Ark., to utilize mine waste. H. C. Couch is president.

The Central Mfg. Co., Inc., 2521-29 Montgomery Street, St. Louis, manufacturer of electrically-operated washing machines, is planning to rebuild the portion of its factory destroyed by fire Aug. 29. An official estimate of loss has not been made.

The Theiling-Lothmann Mfg. Co., 3810 North Ninth Street, St. Louis, is considering tentative plans for rebuilding the portion of its work-working plant destroyed by fire Aug. 27, with loss approximating \$90,000, including machinery.

The Casey-Hedges Co., Chattanooga, Tenn., manufacturer of boilers, tanks, stacks, etc., has acquired over 40 acres in the Missionary Ridge section, a portion of the site to be used for a new plant.

A vocational department will be installed in the new high school to be erected at Jennings, Kan., two-stories, 61 x 132 ft., estimated to cost \$80,000, for which work will commence at once. Smith & English, Nelson Building, Hutchinson Building, Hutchinson, Kan., are architects.

The Van Buren Glass Co., Van Buren, Ark., has been organized to take over the plant and business of the Arkansas Products Co., specializing in the manufacture of steam gage

tubing and other precision glass specialties. The plant, which has been closed for about a year, will be remodeled and additional equipment installed for the production of a new line of glass products. Howard Pratt is manager.

The DeLong Machine Co., East Murdock Street, Wichita, Kan., plans the installation of a lathe, drill press and other machine tools. J. F. DeLong is head.

Vocational departments will be installed in the three new junior high schools to be erected at Springfield, Mo., upon which work will be placed under way at an early date. The structures will be each three-stories, 63 x 175 ft.; 60 x 172 ft. and 60 x 170 ft., estimated to cost \$180,000, \$200,000 and \$200,000, respectively. Earl Hawkins & Co., 400 McDaniel Building, are architects.

The Central Power & Light Co., Walnut Ridge, Ark., is arranging for the installation of additional equipment at its power plant.

The Missouri Electric Light & Power Co., St. Louis, is being organized by officials of the Union Electric Light & Power Co., to succeed the latter company, under a plan approved by the Public Service Commission. The new company will be capitalized at \$25,000,000 and plans are being perfected for the expenditure of a large fund for extensions and improvements in power plants and system, including the construction of a power plant near the municipal bridge.

The Imboden Hydro-Electric Power & Mfg. Co., Imboden, Ark., recently organized with a capital of \$100,000, is considering plans for the establishment of a factory to manufacture agricultural equipment. W. R. Lane is president.

The Common Council, McCracken, Kan., has plans nearing completion for a new municipal electric power plant to cost close to \$50,000. The Ruckel Engineering Co., Hutchinson, Kan., is engineer.

The Meade Fibre Co., Kingsport, Tenn., is perfecting plans for erection of a factory to manufacture paper and fibre products, estimated to cost in excess of \$600,000, including machinery. J. H. Thickens is general manager.

The Clover Farm Dairy Co., 789 Union Avenue, Memphis, Tenn., will build a new ice-manufacturing plant in connection with a three-story dairy, 60 x 140 ft., at Union Avenue and Walnut Street. A power plant will also be constructed. The entire works will cost about \$250,000, including equipment. L. N. Leonard is general manager.

A vocational department will be installed in the new high school, 75 x 164 ft., to be erected at Coal Creek, Tenn. Manly & Young, Knoxville, Tenn., are architects.

A one-story power plant will be constructed by the Dixie Spinning Mill, affiliated with the Dixie Mercerizing Co., Chattanooga, Tenn., in connection with its new spinning mill, estimated to cost \$200,000. Carter Lupton is president.

The Bevis Salt Co., Lyons, Kan., is arranging a list of power and other equipment to be installed in its addition, estimated to cost about \$175,000.

The Pacific Coast

SAN FRANCISCO, Sept. 5.

PLANS are in progress by the Pacific Coast Borax Co., 2 Pine Street, San Francisco, for the first unit of its new refinery at San Pedro, consisting of a two-story building, 250 x 400 ft., with foundations to provide for three additional floors later. Albert C. Martin, 430 Higgins Building, Los Angeles, is architect.

The California Gypsum Co., National City, Cal., is perfecting plans for new works on the waterfront for the manufacture of blocks and other gypsum products, estimated to cost in excess of \$75,000.

The Anaheim Sugar Co., Anaheim, Cal., has awarded a contract to G. E. Fickett, 638 South Western Avenue, Los Angeles, for a new five-story addition, 44 x 260 ft., estimated to cost about \$150,000.

The Atchison, Topeka & Santa Fe Railroad Co., Kerchhoff Building, Los Angeles, has plans under way for an addition to its ice-manufacturing and car-icing plant at Bakersfield, Cal., and for the erection of a similar plant at Needles, Cal., estimated to cost about \$150,000 each. The company will also rebuild the portion of its engine house and shops at the latter point, damaged by storm Sept. 2.

The Moore Shipbuilding & Drydock Co., Oakland, Cal., has been reorganized as the Moore Drydock Co., with capital of \$3,000,000. Operations will be continued at the plant for new ship construction and ship repair work. The company is headed by Joseph A. Moore, Ira S. Lillick and L. H. Cromwell.

The Teetor Adding Machine Co., Pomona, Cal., has selected a site for the erection of a new plant to manufacture calculating machinery and parts. The initial works will total about 50,000 sq. ft. and with machinery are estimated to cost close to \$200,000. The local Chamber of Commerce is in-

terested in the project. C. J. Carr and J. A. Heaton are heads of the company.

The Oregon Pulp & Paper Co., Salem, Ore., will soon commence the erection of a third mill unit, to be four stories, of reinforced concrete, 75 x 80 ft., estimated to cost approximately \$300,000, including machinery. Knighton & Howell, United States Bank Building, Portland, Ore., are architects.

The Grays Harbor Port Commission, Aberdeen, Wash., will receive bids until Sept. 23 for one 5-ton, mill type, traveling crane, 75 ft. span, equipped with lumber grapple. Frank H. Lamb is president.

The Webster Chair Co., Superior, Wis., is arranging for the erection of a new four-story plant, 100 x 200 ft., at Portland, Ore., on property recently acquired at Nicholai and Twenty-sixth Streets, for a Pacific Coast branch.

The Long Bell Lumber Co., Kansas City, Mo., is planning the construction of two plants on the Columbia River, one near Kelso, Wash., and the other at Rainier, Ore. A railroad line 15 miles long will be constructed from the timber properties of the company in this section. The project will cost in excess of \$600,000, including machinery.

Canada

TORONTO, Sept. 11.

BUYING of one or two machine tools is still well maintained, and while inquiries calling for fairly large lists are appearing none of this business has so far been closed. Additional contracts for extensions to the Leaside plant of the Durant Motors of Canada have been placed, but nothing has so far been done in the equipment line and dealers and manufacturers are looking forward to a sizable order from this quarter. Building activities among industrial plants continue, and as many concerns have been holding back orders pending a settlement in the fuel situation it is expected that a number of these will enter the market before the end of the year. The general outlook with regard to orders and the possibility of securing fuel is having a stimulating effect on business in general and not a few industrial concerns are preparing for active operations through the winter. Prices are beginning to show an upward tendency and while increases have not been general one or two companies have announced higher quotations on their equipment.

C. Alfred Maguire, chairman of the Board of Control, Toronto, will receive bids until Oct. 3 for the supply and installation of two 2,380,000 Imperial gallon centrifugal sewage pumps and motors. Specifications can be seen at room 6, City Hall.

Graves, Bigwood & Co., Bank of Hamilton Building, Toronto, will rebuild a box factory recently destroyed by fire at Byng Inlet, Ont., and are interested in equipment.

The Anaconda American Brass Co., New Toronto, Ont., is contemplating the erection of a foundry. A. H. Quigley is general manager.

The Hull Electric Co., 117 Main Street, Hull, Que., will erect a power plant in Low Township, Que.

Contract for the construction of a power plant, dam and intake at Price, Que., for the Lower St. Lawrence Power Co., Rimouski, Que., has been awarded to the Foundation Co., Ltd., 511 St. Catharine Street West, Montreal.

The National Castings, Ltd., Belleville, Ont., is making additions to its plant and installing a Pittsburgh electric furnace and other equipment.

Considerable improvements and extensions are under way at the plant of the Electric Steel & Metals, Ltd., Welland, Ont., which is being converted for the production of manganese and other metals, heavy castings and mining equipment. The electric furnace capacity is also being increased.

Contracts for the construction of new buildings at Leaside, Ont., to cost approximately \$1,000,000, for the Durant Motors of Canada, Ltd., Toronto, have been awarded. The new plant will have floor space of 500,000 sq. ft. and will be used exclusively for the manufacture of Star cars. Production for 1923 calls for 18,000 cars, of which 10,000 will be for the domestic trade and 8000 for export.

It is reported that construction will be started this season on the plant at Petrolia, Ont., for the Peninsula Sugar Co., which will cost approximately \$800,000. Machinery of special design, electrically driven, will be installed and it is expected that the plant will be in operation by September, 1923.

The Imperial Radiator Co., Ltd., Toronto, an organization

formed by the bondholders of Steel & Radiation, Ltd., have taken over the assets and property of the latter company at Toronto and St. Catharines for \$400,000. Steel & Radiation has been in the hands of receivers for several months, but the plant has been in operation since the first of the year. The new concern will have improved financial standing and attention will be confined entirely to the production of radiators and heating boilers. J. E. McAllister, Toronto, is president and E. T. Wingate, general manager.

IRON AND INDUSTRIAL STOCKS

No Desire to Liquidate—Prices High Owing to Production Costs

Steel and industrial stocks held by consumers may be large, but there seems to be no desire to liquidate them. On the contrary, the disposition is to build up stocks against the fully expected traffic congestion. Prices are more or less inflated owing to the increased production costs, and will likely be looking up for six or eight months, according to several estimations. Apparently both buyers and sellers have stopped to make fresh appraisals of the situation in the light of strike developments and the predicted congestion. However, the situation is full of cross currents and one view discredits the inflationary trend, holding optimistically that the usual September turn in business will show renewed vigor.

Acquired by American Brake-Shoe & Foundry Co.

The American Brake-Shoe & Foundry Co., 30 Church Street, New York, recently acquired the Ramapo Iron Works, which has plants at Hillburn and Niagara Falls, N. Y., also at Niagara Falls, Ont., and the Ajax Forge Co., with plants at Chicago and Superior, Wis. The assets of the acquired companies will be held by a new corporation to be known as the Ramapo Ajax Corporation. Announcement has been made by Marshall Field, Gloré, Ward & Co. that in order to finance the purchase \$2,250,000 of first mortgage, 20-year, 6 per cent sinking fund gold bonds of the Ramapo Ajax Corporation will be offered for public subscription at par. The American Brake-Shoe & Foundry Co. covenants in the mortgage to retain control of the new company as long as any of the bonds are outstanding. The acquired corporations have been in business since 1883 and manufacture railroad track material, as well as industrial cars and car equipment.

Industrial Finances

Approximately \$42,000 will be available for distribution among creditors of the Conradson Machine Tool Co., Green Bay, Wis., whose claims amount to between \$150,000 and \$175,000. The plant, real estate, machinery, patents, etc., have been sold to Joseph T. Ryerson & Son, Chicago, which has been marketing the bulk of the output of the Conradson company since it was established in Green Bay about four years ago with an investment of about \$125,000 in buildings and equipment. The Ryerson bid was \$55,000, including the assumption of a \$10,000 mortgage. Representatives of the Ryerson company said the plant probably would be resold, as the company is not engaged in manufacturing and it is not likely that any change in policy will be made.

The Security Trust Co. of Detroit has been appointed receiver for the W. J. Baird Machinery Co., 2232 West Fort Street. The creditors have filed a petition alleging bankruptcy, and it is not expected that the company will protest these proceedings.

For the year ending with June, the Canadian Locomotive Co. shows an operating loss of \$191,351 after taxes, contrasted with a profit of \$827,091 the previous year. After providing for interest, dividends, etc., the company for the past year showed a deficit of \$446,299, whereas for the previous year there was a surplus of \$340,291.

The terms of the proposed merger of the Atlas Crucible Steel Co. and the Electric Alloy Steel Co. will be submitted this month to the stockholders. The plan as it now stands calls for a new capitalization of approximately \$12,000,000 made up in bonds, two classes of preferred stock, as well as no-par common shares.

Between Jan. 1 and Aug. 31, last, the Baldwin Locomotive Works booked \$30,389,611 business, or practically double the \$15,654,390 taken during the corresponding period last year. In August, business totaled \$12,292,342, as against an aggregate of \$11,824,687 in the first six months of the year.

The Lima Locomotive Co., Lima, Ohio, on Nov. 1 will

call for redemption the outstanding 6 per cent first mortgage sinking fund bonds at the principal amount and a premium of 10 per cent. The original issue was \$2,000,000, but the number of outstanding bonds has dwindled to a comparatively small amount.

The Autocar Co., Ardmore, Pa., motor trucks, is offering for public subscription \$1,000,000 8 per cent cumulative preferred stock at \$102 a share. The stock is callable at \$115 a share. Temporary receipts bearing 6 per cent interest per annum until Sept. 15 have been issued to subscribers of the new stock issue.

A public offering was made last week of \$1,775,000 Wickwire-Spencer Steel Corporation 7½ per cent ten-year secured convertible notes at 100 and accrued interest.

The Dayton Coal & Iron Co. cases, involving \$1,000,000 in claims, have finally been settled after having been in the courts nine years. Non-resident creditors are to get 60 per cent without interest, Tennessee creditors 100 per cent without interest, and the remainder of the assets are to be paid to the Commercial Bank of Scotland and the Bank of Scotland, which are to secure releases of the claims of James Watson & Co. and Dunlop & Co.

The stockholders of the Wickwire-Spencer Steel Corporation have ratified the action of the board of directors in arranging for the acquisition of the entire capital stock of the American Fabrics Co., Chicago. Although under the supervision of the corporation, the acquired company will operate independently. It was also voted to authorize the sale of \$1,775,000 principal amount of ten-year 7½ per cent secured convertible gold notes of the Wickwire-Spencer Corporation to finance the purchase.

The Westinghouse Electric & Mfg. Co. has declared the regular quarterly dividends of \$1 on both the common and preferred stocks. The common stock dividend is payable Oct. 31, and the preferred Oct. 16, to stockholders of record Sept. 30.

The New York Air Brake Co. has plans under way in which the present capital stock will be retired and new common stock without par value will be issued as well as a series of class A preferred. The new common issue will be in approximate ratio to the present \$10,000,000 of outstanding common stock at \$100 par value. The success of the plan will raise about \$5,000,000 of new capital which will enable the company to retire its bank loan which amounts to about \$4,500,000. The remainder will be added to working capital.

The American Locomotive Co., for the six months ended June 30, reports a total deficit of \$966,780, as compared with a net profit for the corresponding period in 1921 of \$4,556,043, a decrease of \$5,522,823. The gross earnings amounted to \$7,399,934, against \$25,989,781 for the first half of last year. Manufacturing, maintenance and administrative expenses, and depreciation however, was only \$8,323,500, as compared with \$21,390,554 for the same period in 1921. The gross earnings over the first half of 1922 were the lowest of any six months since the early part of 1915. The strong cash position of the company due to conservation of its net earnings during years of greater earnings, warranted the payment in the six months period of two quarterly dividends, each of 1½ per cent on its preferred stock, and two quarterly dividends of 1½ per cent on its common stock, a total of dividends paid of \$1,625,000 during the half year.

The Carroll Engineering Co., Dayton, Ohio, has been placed in the hands of a receiver, Joseph F. Westendorf being appointed by the court. The company, which manufactures tools and other machine shop equipment, has been operating at a loss for the past six months. It has not been decided whether, in view of improving business conditions, operations will be continued for the time being or the plant closed entirely.

Rogers-Brown Finances

The balance sheet of the Rogers-Brown Iron Co. and subsidiaries, as of Dec. 31, 1921, follows:

Assets: Property account, \$18,547,842; Liberty bonds held on behalf of employees, \$8,116; deferred charges, \$487,856; cash, \$542,115; other current assets, \$2,720,785; cash in hands of fiscal agents for coupon interest, \$106,700; total, \$22,413,414.

Liabilities: Common stock, \$5,000,000; preferred stock, \$1,550,000; first mortgage 5 per cent bonds, \$1,483,000; debenture 5 per cent bonds, \$980,000; first and refunding mortgage bonds, \$3,794,000; notes payable, \$3,034,626; other current liabilities, \$970,782; bond coupon interest, \$106,700; reserves for depreciation, etc., \$5,051,414; surplus, \$442,891; total, \$22,413,414.

The Wickwire Spencer Steel Corporation sales office, 120 Franklin Street, Boston, is to be discontinued. A New England divisional sales office will be maintained at the company's Hammons Street, Worcester, Mass., plant, with Charles K. Hardy, assistant general sales manager, in charge.

Plans of New Companies

The E. J. Longyear Co. of Minnesota has for many years been engaged in mining engineering, contract diamond core drilling, diamond core drill manufacturing, and shaft sinking and mine development work. In order that the various activities of the company might be segregated, separate corporations were recently organized to take over the respective branches of the company's business. The E. J. Longyear Development Co., Inc. (Alabama), handles shaft sinking and mine development; E. J. Longyear Exploration Co. (Delaware) does contract diamond core drilling, and E. J. Longyear Mfg. Co. (Delaware) manufactures diamond core drills. The new manufacturing company, whose general office is in the Security Building, Minneapolis, has taken over in its entirety the plant at Marquette, Mich., formerly operated by E. J. Longyear Co. No expansion of the present activities is under contemplation.

The Baldwin Aircraft Corporation, Baldwin, L. I., has obtained possession of the properties of the Ordnance Engineering Corporation, and has announced that it is in a position to execute orders for aircraft, aircraft parts and for various machine shop, sheet metal and wood work. Its plant is located midway between Mineola and Far Rockaway, which makes it possible to deliver both land and water machines by air. W. F. Bennett, formerly secretary and treasurer of the Lewis & Vought Corporation, is president, and J. J. Rooney is general manager.

The Arras Equipment Co., 68 Cortlandt Street, New York, has been incorporated with a capital of \$5,000, to manufacture mechanical and electrical equipment. For the present it will engage in the reconstruction of motors and in general repair work. The incorporators are: T. N. Pfeiffer and M. P. Bloch.

The A. E. Thurber Elevator Co., Brooklyn, has been incorporated with a capital of \$10,000 to manufacture elevators and parts. It will have its work done under contract. The incorporators are: A. E. Thurber, J. L. Walton and J. J. Hayden. The company is represented by Hastings & Hastings, 258 Broadway, New York.

The Triangle Lamp Mfg. Co., New York, has been incorporated with a capital of \$5,000 to manufacture electric lamps. It is conducting a jobbing business and does not intend to manufacture for the present. The incorporators are: E. Max, A. Bernstein and E. Levy. The company is represented by Goodman & Werner, 51 Chambers Street, New York.

The Adelphia Mfg. & Plating Co., Bridesburg, Philadelphia, manufacturer and plater of iron, brass, steel and metal products, has been incorporated with a capital of \$20,000, and will continue the business of the Adelphia Plating Co., established in 1917. It is in the market for complete foundry equipment. A brass foundry is being added and the company will specialize in aluminum castings. It is also erecting a new one-story building at Orthodox and Belgrade Streets which will be permanent headquarters. J. F. O'Brien, 4514 Paul Street, is secretary and treasurer.

The F. Wilson Ille Electric Corporation has been incorporated with a capital of \$10,000 to manufacture X-ray equipment and electrical apparatus. It will represent the Burdick Cabinet Co., Thompson Plaster X-Ray Co. and the Morse-Chapman Co., handling galvanic and sinusoidal outfits, scales, violet ray outfits, lamps, generators and accessories. This company does not plan to manufacture for the present. Its offices after Sept. 15 will be at 111 East Twenty-third Street, New York. The incorporators are: F. Wilson Ille, J. Ferguson and J. Wolfert.

The Liberty Tool & Die Corporation, 215-217 North Water Street, Rochester, N. Y., general tool and die manufacturer, mentioned in last week's issue of THE IRON AGE under new companies, announces that while it has not undertaken to do a general manufacturing business, it nevertheless has the space and equipment for such an enterprise and is willing to consider propositions of that nature.

The Alemit Grease Cartridge Co., 61 Broadway, New York, has been organized with a capital stock of \$600,000 to manufacture metal grease cartridges for automobile lubrication. Operations have already begun with an initial output of 20,000 cartridges per day at the plant in Philadelphia. Provision has been made for gradual expansion. The company is headed by C. E. Roberts and E. C. Landgren. C. M. Russell, 59 Church Street, New York, is the corporate representative.

The Universal Darning Machinery Corporation, New York, has been incorporated with a capital of \$500,000 to manufacture textile machinery and parts. Its plans for manufacturing are still pending. The incorporators are: S. Sims and C. M. Fyfe. The company is represented by E. A. McAllister, 2 Rector Street, New York.

The Ohio Auto Parts Mfg. Co. will establish a plant in Lima, Ohio, for the manufacture of castellated nuts. It is now located in Marion, Ohio. O. B. Prime is secretary.

The National Lamp Works of the General Electric Co., Cleveland, has commenced the erection of a \$75,000 factory and storage building in Youngstown, Ohio. It will be 97 x 134 ft., three and four stories.

The Multiple Oil Well Tool Co., Detroit, was recently incorporated with a capital of \$30,000, to manufacture oil well machinery and tools. Its work for the present will be done under contract.

Trade Changes

Allen Ashley, associated with the domestic sales department of the Westinghouse Electric & Mfg. Co. for 10 years and with the foreign sales department of the Allied Machinery Co. of America for four years, has established a clearing house to handle surplus machinery and supplies at 152 West Forty-second Street, New York.

The Oilgear Co., Milwaukee, has opened a New York office at 39 Cortlandt Street in order to be in direct touch with the entire Eastern territory. Russell, Holbrook & Henderson, 30 Church Street, New York, have been appointed sales representatives for the district in and near New York. Cadillac Machinery Co., Lafayette and Beaubien Streets, Detroit, will handle Oilgear products in Michigan, and R. E. Ellis Engineering Co., 621 Washington Boulevard, Chicago, will represent the Oilgear Co. in Chicago and the surrounding district.

The New Process Gear Division of the Willys Corporation, with plants at Syracuse, N. Y., was bought last week at receivers' sale by Tom Warner, Toledo, Ohio, for \$1,904,000. Mr. Warner, who is vice-president of the Durant Motors, Inc., said that he acted individually.

The Detroit office of the Reed-Prentice Co. is now located at 6526 Cass Avenue. T. C. McDonald, formerly of the Indianapolis office, is in charge of the Detroit office, assisted by E. B. Barber, former superintendent of the Lafayette Motor Corporation, Indianapolis.

The Racine Metal Stamping Co., Racine, Wis., has amended its corporate articles to provide for a change in title to Racine Screw Works, to better describe the nature of the principal business in which the concern is now engaged.

The Murdoch Dishwashing Machinery Co., Marion, Ohio, recently incorporated with a capital stock of \$250,000, placed its plant in operation a few days ago. H. A. McKinnon is president and general manager.

The Plainville Engineering & Supply Co., Russell building, Plainville, Conn., has purchased the Aldridge Block, which it will occupy as soon as alterations can be made.

The R. F. Carpenter Mfg. Co., Cleveland, metal toilet and office partitions, has discontinued its Boston office. Seeley & Lawson, 73 Tremont Street, Boston, will represent the firm.

The plant of the Victoria Chain Co., York, Pa., has been acquired by the International Chain & Mfg. Co., which will erect new buildings. George G. Campbell, who purchased the stock a year ago, continues as president. J. L. Mueller is vice-president in charge of production. The board constitutes these and R. L. Hunt and A. V. Brown, both of Philadelphia, and H. B. North, York.

The Weller Construction Co., Inc., general contracting and engineering, Equitable Building, Washington, has sold or removed all equipment from Carlisle and is not doing any road work at present.

The Goodman-Krohnold Co., Cleveland; the Goodman Engineering Co., Zanesville, Ohio, and the Electrical Repair & Engineering Co. have consolidated to form the Industrial Electric Co., 5230 St. Clair Avenue, Cleveland. The company will specialize in power equipment.

The White Co., Cleveland, Sept. 1, moved its executive offices from 6611 Euclid Avenue to the plant on East Seventy-ninth Street.

The Mehl Machine Tool & Die Co., Roselle, N. J., makers of jigs, fixtures, dies, gages and special machines, has opened an engineering branch in Cleveland for the purpose of closer engineering co-operation with Middle West customers.

G. H. Patten & Co., 1901 Pine Street, St. Louis, manufacturer of special machinery, has changed the firm name to the Patten Mfg. Co.; also its address to Chattanooga, Tenn.

The Ludlum Steel Co., Watervliet, N. Y., announces the discontinuance of its Pittsburgh office and the consolidation of the business of that office with the Cleveland office. P. R. Thurston, who has been in charge of the Pittsburgh office for the past three years, remains with the company and will continue to handle sales in the territory formerly embraced by the Pittsburgh office, with some additional territory, out of the Cleveland office, 637 Guardian Building, that city.

The Bathurst Co., Ltd., Bathurst, N. B., will build a paper mill in the near future for the manufacture of newsprint. It will adjoin the present buildings and will be of steel and concrete. The initial capacity will be 50 tons per day, to be increased later to 100 tons.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	2.94c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.94c.
Hoops, base price	4.29c.
Bands, base price	3.74c.
Beams and channels, angles and tees	
3 in. x 1/4 in. and larger, base	3.04c.
Channels, angles and tees under 3 in.	
x 1/4 in., base	2.94c.

Merchant Steel

	Per Lb.
Tire, 1 1/2 x 1/2 in. and larger	2.94c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger) ..	3.14c.
Toe-calk, 1/2 x 3/8 in. and larger	4.00c.
Cold-rolled strip, soft and quarter hard ..	6.75c. to 7.25c.
Open-hearth spring steel	4.50c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex.	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

1/4 in. and heavier	3.04c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	4.04c. to 4.19c.
No. 12	4.09c. to 4.24c.
No. 14	4.14c. to 4.29c.
No. 16	4.24c. to 4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.55c. to 4.70c.	.....
Nos. 22 and 24	4.60c. to 4.75c.	4.60c.
No. 26	4.65c. to 4.80c.	4.65c.
No. 28	4.75c. to 4.90c.	4.75c.
No. 30	5.00c. to 5.15c.	.....
No. 28 and lighter, 36 in. wide, 10c. higher		

Galvanized

	Per Lb.
No. 14	4.85c. to 5.00c.
No. 16	5.00c. to 5.15c.
Nos. 18 and 20	5.15c. to 5.30c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.60c.
No. 27	5.60c. to 5.75c.
No. 28	5.75c. to 5.90c.
No. 30	6.25c. to 6.40c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel			Wrought Iron		
	Black	Galv.		Black	Galv.
1/2 in. Butt.	—53	—38	3/4 in. Butt.	—23	—5
3/4 in. Butt.	—58	—45	1 1/2 in. Butt.	—25	—7
1-3 in. Butt.	—60	—47	2 in. Lap.	—19	—3
2 1/2-6 in. Lap.	—57	—44	2 1/2-6 in. Lap.	—23	—7
7-8 in. Lap.	—53	—30	7-12 in. Lap.	—15	+1
9-12 in. Lap.	—49	—30			

Steel Wire

	Per Lb.
BASE PRICE* ON NO. 9 GAGE AND COARSER	
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19 1/4c. to 20 1/4c.
High brass wire	20 1/4c. to 20 3/4c.
Brass rod	16 3/4c. to 17 1/4c.
Brass tube, brazed	26 1/4c. to 27 1/4c.
Brass tube, seamless	23 c. to 23 1/2c.
Copper tube, seamless	25 3/4c. to 26 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22 3/4c. to 23 3/4c. per lb. base.
Cold rolled, 14 oz. and heavier. 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
IC. \$10.00	\$8.50	80 lb. \$6.05	\$5.80
IX. 11.50	10.00	90 lb. 6.15	5.90
IXX. 13.00	11.25	100 lb. 6.25	6.00
IXXX. 14.25	12.50	IC. 6.40	6.15
IXXXX. 16.00	14.00	IX. 7.40	7.15
		IXX. 8.40	8.15
		IXXX. 9.40	9.15
		IXXXX. 10.40	10.15

Terne Plates

8-lb. coating, 14 x 20	
100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	36c.
Bar	43c. to 47c.

Copper

Lake ingot	15 1/4c.
Electrolytic	15 c.
Casting	14 3/4c.

Spelter and Sheet Zinc

Western spelter	8 1/2c.
Sheet zinc, No. 9 base, casks	9 1/4c. open 9 3/4c.

Lead and Solder*

American pig lead	6 3/4c. to 7c.
Bar lead	8c. to 8 1/2c.
Solder, 1/2 and 1/2 guaranteed	25c.
No. 1 solder	23 1/2c.
Refined solder	20 1/4c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6 1/2c. to 7c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	25c. to 27c.
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Old Metals

Prices show little change and the market generally is stronger. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25

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